



**HITACHI**

# Instruction Manual

**8**

**8mm Video Camera/Recorder**

## VM-E15A



**Hitachi Home Electronics (America), Inc.**

For information concerning repairs, operation or technical assistance,  
please contact the Service Department of your nearest Regional Office.

**Eastern Regional Office**

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3300 Trans Canada Highway, Pointe Claire,  
Quebec, H9R 1B1, CANADA

Tel. 514-697-9150



**WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.**



**CAUTION**  
**RISK OF ELECTRIC SHOCK**  
**DO NOT OPEN**



This symbol warns the user that uninsulated voltage within the unit may have sufficient magnitude to cause electric shock. Therefore, it is dangerous to make any kind of contact with any inside part of this unit.

**CAUTION:** TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER — SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



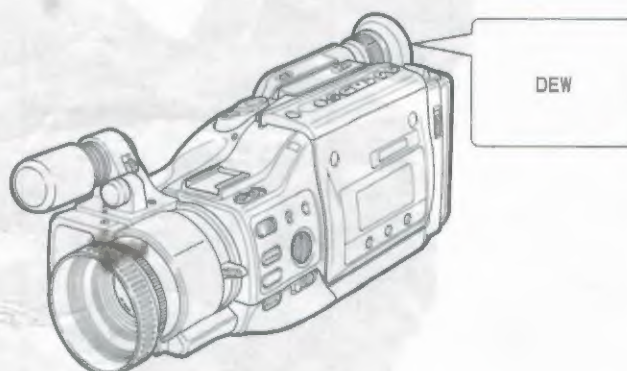
This symbol alerts the user that important literature concerning the operation and maintenance of this unit has been included. Therefore, it should be read carefully in order to avoid any problems.

**CAUTION:**  
**TO PREVENT ELECTRIC SHOCK DO NOT USE THIS (POLARIZED) PLUG WITH AN EXTENSION CORD, RECEPTACLE OR OTHER OUTLET UNLESS THE BLADES CAN BE FULLY INSERTED TO PREVENT BLADE EXPOSURE.**

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference regulations of the Canadian Department of Communications.

## MOISTURE

Moisture may occur if the video camera/recorder is moved from a cold area to a warm humid area. A flashing "DEW" indication in the viewfinder indicates that moisture is on the recorder mechanism, which could result in tape damage. When the "DEW" indication in the viewfinder is flashing the unit will not operate. When this happens, press the "EJECT" button, remove the tape, and wait for the moisture to dry ..... the "DEW" indication in the viewfinder will stop flashing.



## PRECAUTIONS

Any problems that occur as a result of any of the following conditions will not be covered by our warranty.

■ **No water, dust or sand**

Be careful that no water, dust or sand enters the camera/recorder.

■ The solid-state image sensor is basically immune to direct sunlight or excessively bright objects, but, avoid prolonged exposure.

■ When you are not using the camera/recorder, switch off the power and attach the lens cap.

■ When you shoot at a scene which contains an extremely bright object such as the sun or a light source, a bright vertical bar may appear in the picture.

Your camera/recorder is functioning properly, but the solid-state pickup device (C.C.D) usually causes this as an inherent characteristic. Try to avoid shooting an excessive bright object directly.

■ Be sure not to leave it in a place where the temperature exceeds 120°F, or the pickup device may be damaged.

Dangerous includes:

• Inside a car with the windows closed and in direct sunshine.

• Near heating appliances.

■ Do not leave the viewfinder lens facing sunlight for a prolonged period, or the phosphorescent surface of the cathode ray tube may be damaged.



Congratulations on buying the **8** video camera/recorder. For maximum pleasure and convenience please read these simple instructions before operating your camera/recorder.

**WARNING:** Many television programs and films are copyrighted. In certain circumstances, copyright law may apply to private in-home video taping of copyrighted materials.




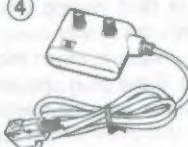
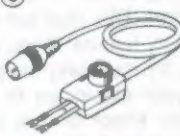
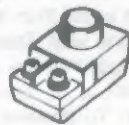
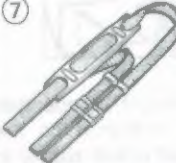



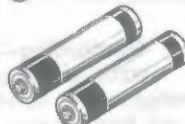


## FEATURES

- Solid-state camera pickup
- Program AE (Auto Exposure)
- Auto Focus Power Zoom Lens with macro feature
- High speed shutter
- Time Lapse and one-shot recording
- Flying Erase Head
- Audio/Video dub
- Time and date
- Titler
- Wireless Remote Control

## ACCESSORIES

Check to make sure you have the following components and accessories (besides the camera/recorder unit itself) before disposing of the packing material.

1. AV Input Cord
2. Battery Pack
3. AC Adapter/Charger
4. RF Output Adapter
5. 75-ohm Coaxial Cable with Antenna Adapter
6. Antenna Adapter (300-ohm to 75-ohm)
7. Shoulder Strap
8. Battery for Clock/Date
9. AC Plug Adapter
10. External Power Adapter
11. Batteries for Remote Controller
12. Remote Controller
13. AV Output Cord

<p>①</p>  <p>Part No. 5860791</p>	<p>②</p>  <p>VM-BP82</p>	<p>③</p>  <p>VM-AC80A</p>
<p>④</p>  <p>Part No. 4131694</p>	<p>⑤</p>  <p>Part No. 5857961</p>	<p>⑥</p>  <p>Part No. 5688282</p>
<p>⑦</p>  <p>Part No. 4131013</p>	<p>⑧</p>  <p>CR-2025</p> <div> <p><b>WARNING:</b> Keep this battery away from children. If swallowed, consult a physician immediately for emergency treatment.</p> </div>	
<p>⑨</p>  <p>Part No. 5699441</p>	<p>⑩</p>  <p>Part No. 4131501</p>	<p>⑪</p>  <p>AAA size batteries</p>
<p>⑫</p>  <p>Part No. 5615222</p>	<p>⑬</p>  <p>Part No. 5860781</p>	



# IMPORTANT SAFEGUARDS

In addition to the careful attention devoted to quality standards in the manufacture of your video product, safety is a major factor in the design of every instrument. But, safety is your responsibility too.

This page lists important information that will help to assure your enjoyment and proper use of a Video Camera/Recorder and accessory equipment. Please read it carefully before operating your video product and keep it in a handy place for future reference.

## INSTALLATION

- 1 Read and Follow Instructions**—All the safety and operating instructions should be read before the video product is operated. Follow all operating and use instructions.



- 2 Retain Instructions**—The safety and operating instructions should be retained for future reference.

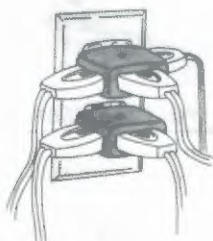
- 3 Heed Warnings**—Comply with all warnings on the video product and in the operating instructions.

- 4 Polarized Plug**—This video product is equipped with a polarized alternating-current line plug (a plug having one blade wider than the other). This plug will fit into the power outlet only one way. This is a safety feature. If you are unable to insert the plug fully into the outlet, try reversing the plug. If the plug should still fail to fit, contact your electrician to replace your obsolete outlet. To prevent electric shock do not use this polarized plug with an extension cord, receptacle or other outlet unless the blades can be fully inserted without blade exposure. If you need an extension, use a polarized cord.



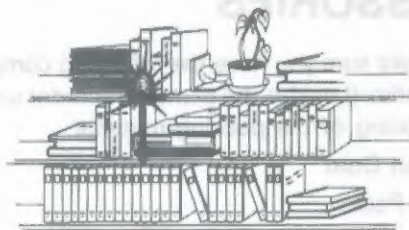
- 5 Power Sources**—This video product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home, consult your video dealer or local power company. For video products intended to operate from battery power, or other sources, refer to the operating instructions.

- 6 Overloading**—Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock. Overloaded AC outlets and extension cords are dangerous, and so are frayed power cords, damaged or cracked wire insulation and broken plugs. They may result in a shock or fire hazard. Periodically examine the cord and have it replaced by your service technician if appearance indicates damage or deteriorated insulation.



- 7 Power-Cord Protection**—Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.

- 8 Ventilation**—Slots and openings in the cabinet are provided for ventilation to ensure reliable operation of the video product and to protect it from overheating. These openings must not be blocked or covered. The openings should never be blocked by placing the video product on a bed, sofa, rug, or other similar surface. This video product should never be placed near or over a radiator or heat register. This video product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the video product manufacturer's instructions have been followed.



- 9 Attachments**—Do not use attachments unless recommended by the video product manufacturer as they may cause hazards.

**Caution:** Maintain electrical safety. Powerline operated equipment or accessories connected to this unit should bear the UL listing mark or CSA certification mark on the accessory itself and should not have been modified so as to defeat the safety features. This will help avoid any potential hazard from electric shock or fire. If in doubt, contact qualified service personnel.

- 10 Water and Moisture**—Do not use this video product near water—for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.

- 11 Accessories**—Do not place this video product on an unstable cart, stand, tripod, bracket, or table. The video product may fall, causing serious injury to a child or adult, and serious damage to the appliance. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the video product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.

- 11A** An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

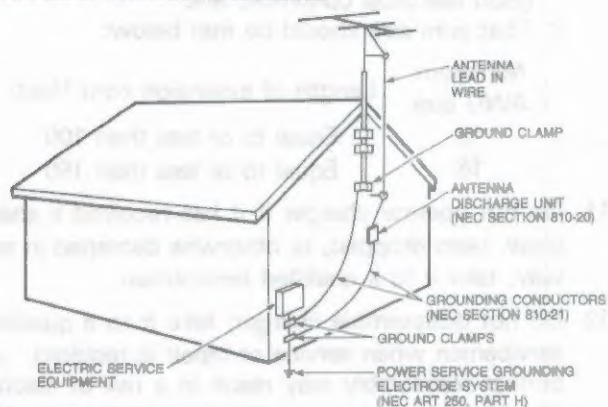


S3125A



**12 Outdoor Antenna Grounding**—If an outside antenna or cable system is connected to the video product, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70-1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See example below.

#### EXAMPLE OF ANTENNA GROUNDING



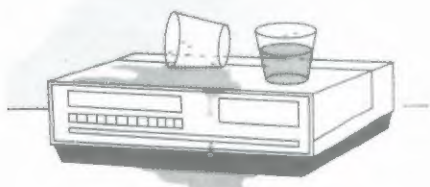
NEC — NATIONAL ELECTRICAL CODE

**13 Power Lines**—An outside antenna system should not be located in the vicinity of overhead power lines or other electric light or power circuits, or where it can fall into such power lines or circuits. When installing an outside antenna system, extreme care should be taken to keep from touching or approaching such power lines or circuits as contact with them might be fatal. Installing an outdoor antenna can be hazardous and should be left to a professional antenna installer.

## USE

**14 Cleaning**—Unplug this video product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.

**15 Object and Liquid Entry**—Never push objects of any kind into this video product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the video product.



**16 Lightning**—For added protection for this video product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable-system. This will prevent damage to the video product due to lightning and power-line surges.



## SERVICE

**17 Servicing**—Do not attempt to service this video product yourself as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

**18 Conditions Requiring Service**—Unplug this video product from the wall outlet and refer servicing to qualified service personnel under the following conditions.

- When the power-supply cord or plug is damaged.
- If liquid has been spilled, or objects have fallen into the video product.
- If the video product has been exposed to rain or water.
- If the video product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions. Improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the video product to its normal operation.
- If the video product has been dropped or the cabinet has been damaged.
- When the video product exhibits a distinct change in performance—this indicates a need for service.

**19 Replacement Parts**—When replacement parts are required, have the service technician verify that the replacements he uses have the same safety characteristics as the original parts. Use of replacements specified by the video product manufacturer can prevent fire, electric shock or other hazards.

**20 Safety Check**—Upon completion of any service or repairs to this video product, ask the service technician to perform safety checks recommended by the manufacturer to determine that the video product is in safe operating condition.

# IMPORTANT SAFETY INSTRUCTIONS FOR AC ADAPTER/CHARGER

1. **Save these instructions** — This page contains important safety and operating instructions for AC Adapter/Charger Model VM-AC80A.
2. Before using AC Adapter/Charger, read all instructions and cautionary markings on (1) AC Adapter/Charger, (2) battery and (3) product using battery.
3. Also read all instructions on pages 4 and 5.
4. **Caution** — To reduce risk of injury, charge only rechargeable battery, VM-BP82 or VM-BP83. Other types of batteries may burst causing personal injury and damage.
5. Do not expose charger to rain or snow.
6. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
7. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
8. Make sure cord is located so that it will not be stepped on, tripped over, or otherwise subjected to damage or stress.
9. Do not operate charger with damaged cord or plug — replace them immediately.

10. An extension cord should not be used unless absolutely necessary.

Use of improper extension cord could result in a risk of fire and electric shock. If extension cord must be used, make sure:

- A. That pins on plug of extension cord are the same number, size, and shape as those of plug on charger.
- B. That extension cord is properly wired and in good electrical condition; and
- C. That wire size should be met below:

Minimum AWG size	Length of extension cord (feet)
18	Equal to or less than 100
16	Equal to or less than 150

11. Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman.
12. Do not disassemble charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire.
13. To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning.



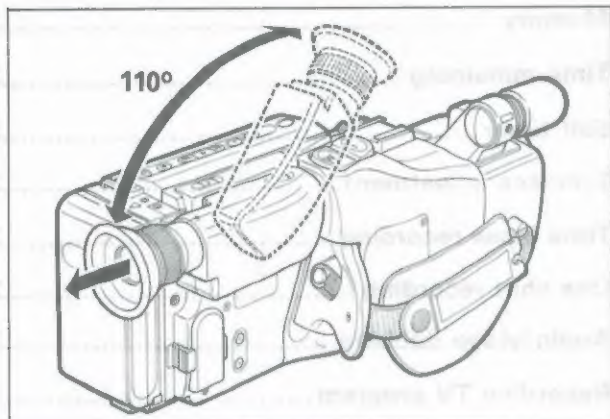
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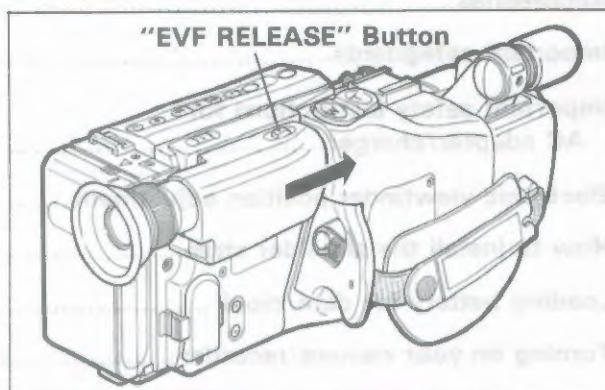
**"Note to CATV system installer:** This reminder is provided to call the CATV system installer's attention to Article 820—22 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical".

## ELECTRONIC VIEWFINDER POSITION ADJUSTMENT

- Adjust the electronic viewfinder to a position where you can see through it easily while holding the "EVF RELEASE" button.



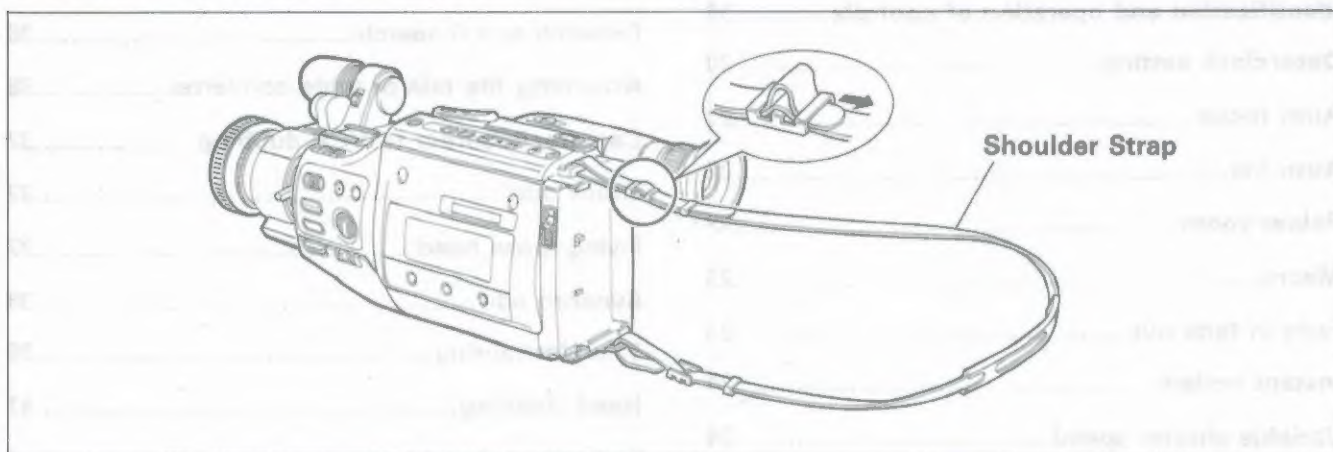
- Put the viewfinder back to original position while holding the "EVF RELEASE" button depressed.



**NOTE:** Put the viewfinder back to original position when storing the camera/recorder into the carrying case or carrying the camera/recorder.

## HOW TO INSTALL THE SHOULDER STRAP

Attach the shoulder strap (Accessory No. 7), as illustrated.



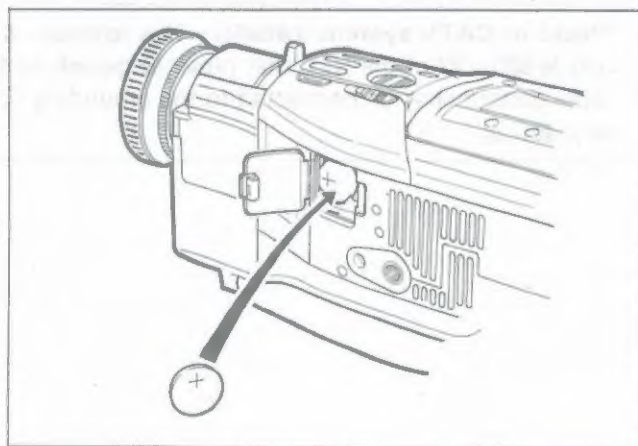
## LOADING BATTERY FOR DATE/CLOCK

You may want to install the clock battery (Accessory No. 8) immediately to prevent misplacing it.

1. Pull the tab to open the cover and expose the compartment.
2. Insert the clock battery with the "+" terminal facing out (as illustrated inside the battery cover).
3. Gently push the cover closed until it snaps into place.

### NOTES:

- When replacing the batteries, use 3V micro lithium cell such as Maxell CR2025 or equivalent.
- Instructions for setting the time and date are on page 20. You can do that later if desired after you're more familiar with your camera/recorder.





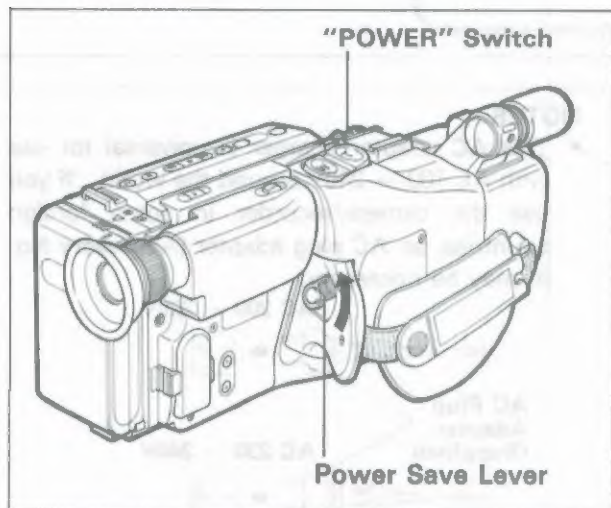
## TURNING ON YOUR CAMERA/RECORDER

The camera/recorder has two power controls — the **"POWER"** switch and power save lever.

### ■ To turn on the camera's power

Slide the **"POWER"** switch to **"CAM"** and then set the power save lever to **"NORMAL"**.

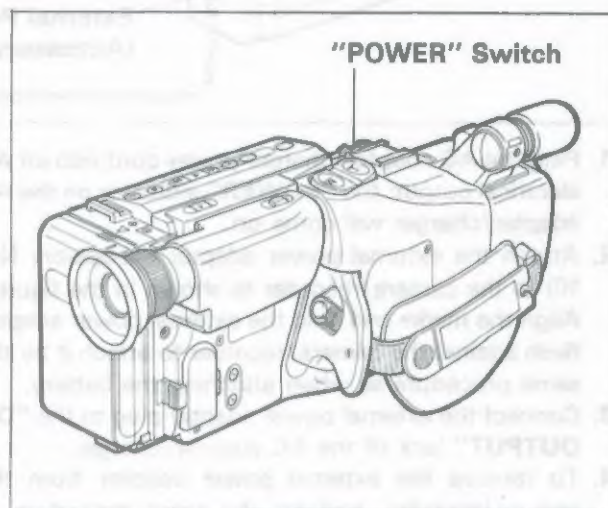
- Hold the small red button in the **"POWER"** switch depressed to slide the switch.
- To turn off the camera's power, slide the **"POWER"** switch to **"OFF"** or set the power save lever to **"POWER SAVE"**.



### ■ To turn on the VCR's power

Slide the **"POWER"** switch to **"VCR"**.

- The power save lever has no effect when the **"POWER"** switch is in the **"VCR"** position.
- To turn off the VCR power, slide the **"POWER"** switch to **"OFF"**.

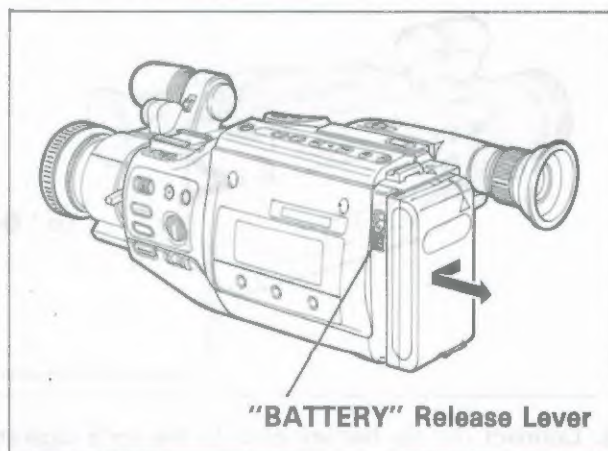
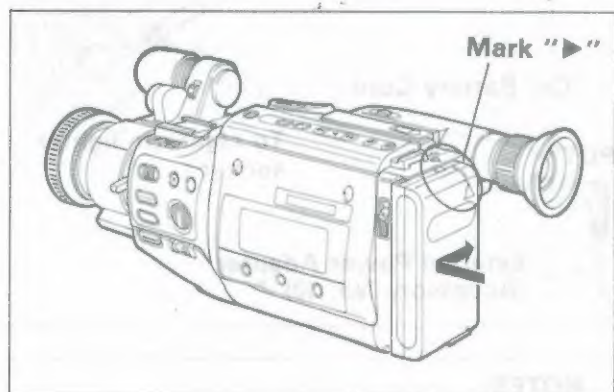


## POWER SOURCES

### ■ WHEN USING WITH THE BATTERY (Accessory No. 2)

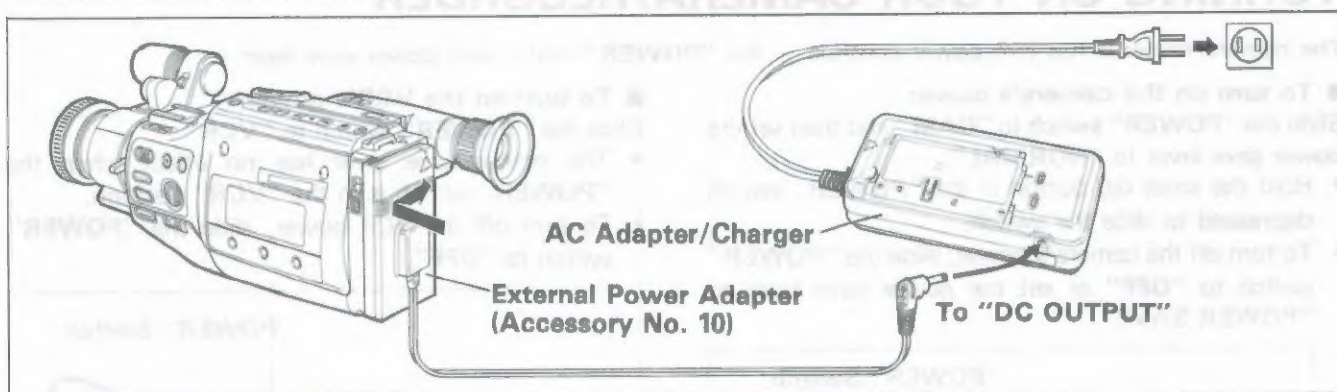
**NOTE:** The battery must be charged before it can be used for the first time. Refer to **"CHARGING THE BATTERY"** on page 12.

1. To attach the battery, align the **"▶"** mark on the battery with that of the camera/recorder.
2. Hold the battery flush against the camera/recorder and slide it in the direction of the arrow.
3. To remove, slide the battery to the left and off while sliding and holding the **"BATTERY"** release lever.





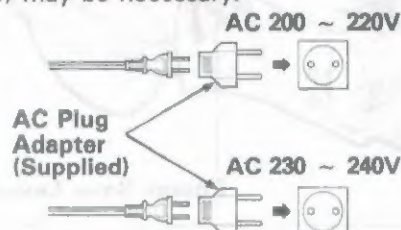
## ■ WHEN USING WITH THE AC ADAPTER/CHARGER (Accessory No. 3)



1. Plug the AC adapter/charger power cord into an AC electrical output; the **"POWER"** indicator on the AC adapter/charger will come on.
2. Attach the external power adapter (Accessory No. 10) to the camera/recorder as shown in the figure. Align the marks and hold the external power adapter flush against the camera/recorder to attach it by the same procedure as when attaching the battery.
3. Connect the external power adapter plug to the **"DC OUTPUT"** jack of the AC adapter/charger.
4. To remove the external power adapter from the camera/recorder, perform the same procedure as when removing the battery.

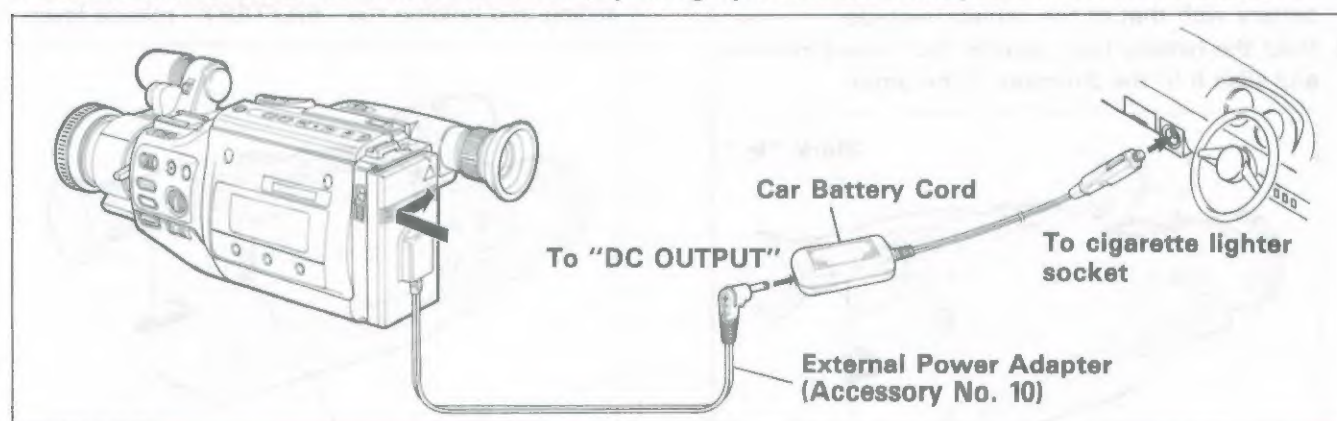
### NOTES:

- This AC adapter/charger is universal for use with AC 100 — 240V around the world. If you use the camera/recorder in some foreign countries, an AC plug adapter (Accessory No. 9) may be necessary.



- When using the AC adapter/charger to power the camera/recorder, the battery level indicator may display **"E—"**. This indicator is used for battery operation and has no meaning when using the AC adapter/charger to power the camera/recorder.

## ■ WHEN USING WITH THE CAR BATTERY (By using optional car battery cord Hitachi VM-CC80A)



1. Connect the car battery cord to the car's cigarette lighter socket.
2. Connect the external power adapter (Accessory No. 10) to the camera/recorder, as illustrated.
  - Attach it by the same procedure as when attaching the battery.
3. Connect the small plug of the external power adapter to **"DC OUTPUT"** of the car battery cord.

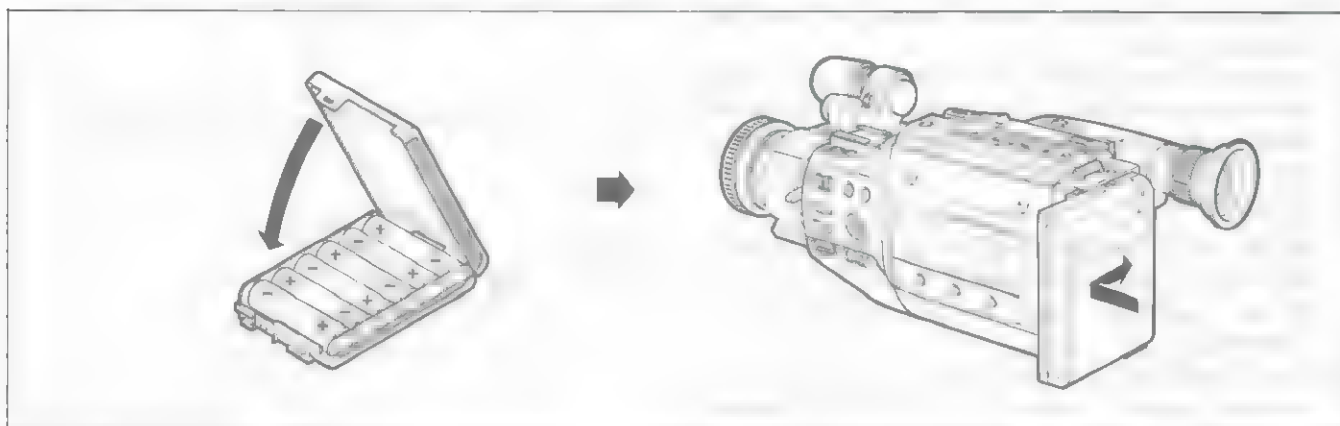
### NOTES:

- The car battery cord is designed to be used only with automobiles having a 12/24-volt negative ground system.
- To prevent fire or shock hazard or damage to your camera/recorder, please use only with Hitachi's car battery cord model VM-CC80A.



## ■ WHEN USING WITH THE BATTERY CASE

(Using the optional Hitachi VM-BP85C Alkaline Battery Case)



1. Insert six "AA" alkaline dry-cell batteries as shown.
2. Attach the battery case to the camera/recorder as shown in the figure.
  - Align the "►" marks and hold the case flush against the camera/recorder, using the same procedure when attaching the battery.

### NOTES:

- The battery case can be used for about 50 minutes at normal temperature (when using Hitachi LR6 batteries).
- The operation time of the battery case varies depending on the batteries used.
- Remove the battery case from the camera/recorder by the same procedure as when removing the battery.
- The battery case cannot be used in cold places.
- Ordinary manganese batteries cannot be used.

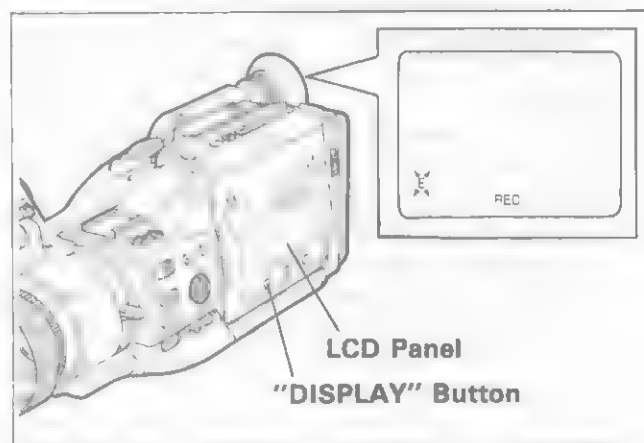
**NOTE:** Be sure to set the "POWER" switch to "OFF" position when attaching or detaching a power supply (battery, AC adapter/charger, etc.) to the camera/recorder.

## CHECKING THE BATTERY

When the "E" indication in the viewfinder appears and flashes while the camera/recorder is operated with a battery (Accessory No. 2) or alkaline battery case (Optional Accessory) during recording, it indicates that the battery charge is insufficient. Then, charge it or replace it with a charged battery.

**NOTE:** The battery level is displayed in both the viewfinder and LCD panel. (If it is not displayed in the viewfinder, press the "DISPLAY" button.)

"E---F" appears in the viewfinder and "■" appears in the LCD panel. As the battery level drops, the indication will change in the order as shown in the figure below. When the battery is very near empty, "--" and "■" will flash. Replace the battery or charge it.



[Viewfinder]



[LCD panel]



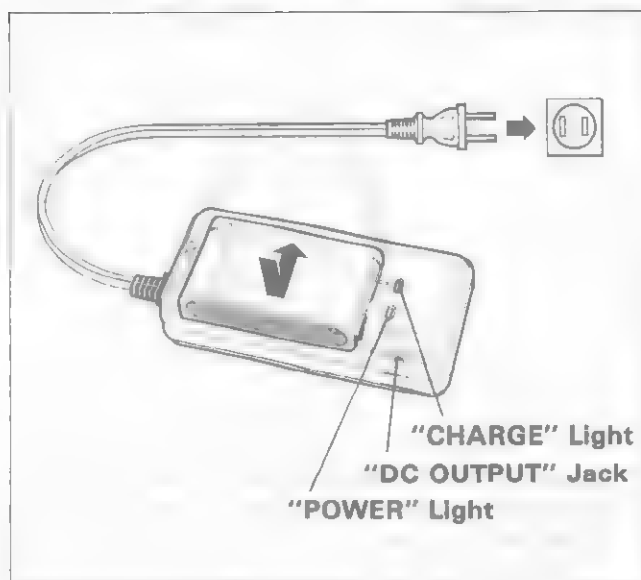


## CHARGING THE BATTERY

1. Plug the AC adapter/charger power cord into AC electrical outlet.
2. Attach the battery to the AC adapter/charger. Align the reference arrow on the battery with that of AC adapter/charger and push the battery flush with the AC adapter/charger and slide it in the direction of arrow.

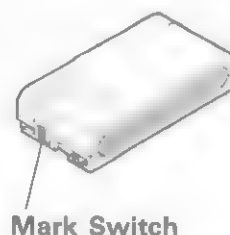
**NOTE:** You must remove the external power adapter from the AC adapter/charger to charge the battery. If the external power adapter is connected, "CHARGE" light will flash.

3. The "CHARGE" light will be lit while the battery is accepting a charge, and will go out when the battery is fully charged.



### NOTES:

1. The time required for charging the battery is approx. one hour.
2. When fully charged, the battery should supply approx. 45 ~ 60 minutes of operating time (depending on how much you use zoom and pause).
3. An optional long play battery may also be charged by the AC adapter/charger. The time for battery charging is approx. two hours.
4. Charge the battery before use and store it at normal room temperature.
5. The battery should be charged at a temperature of 32°F — 95°F (0°C — 35°C) to prevent damage.
6. Do not operate the battery at temperatures below 14°F (—10°C) or above 95°F (35°C). The battery may be damaged if operated at temperatures above 122°F (50°C). Operation time will decrease at extremely low temperatures.
7. After repeated chargings and use, the operation time will gradually decrease. When operation time becomes too short to be useful, it is time to replace the battery.
8. When a battery is attached to the AC adapter/charger, do not turn them upside down. The battery may fall off and be damaged or cause injury.
9. Charging is not possible when the external power adapter is connected to the "DC OUTPUT" jack.
10. If "CHARGE" and "POWER" lights on the AC adapter/charger start flashing, remove the battery and then reattach it. If after several attempts both lights continue to flash, this means your battery cannot take a charge and must be replaced with a new one.  
Both lights will also flash if a hot battery is attached to the AC adapter/charger. Attaching an extremely hot battery to the AC adapter/charger is not recommended; it should be allowed to cool down before being attached.
11. Do not short the battery's terminal.
12. Do not attempt to disassemble or modify the battery. There are no user serviceable parts inside.
13. Throwing the battery into a fire or exposing the battery to excessive heat — over 149°F (65°C) could be hazardous.
14. Set the mark switch of any battery which has already been charged to red as shown in the figure. This lets you discriminate between charged and uncharged batteries easily.

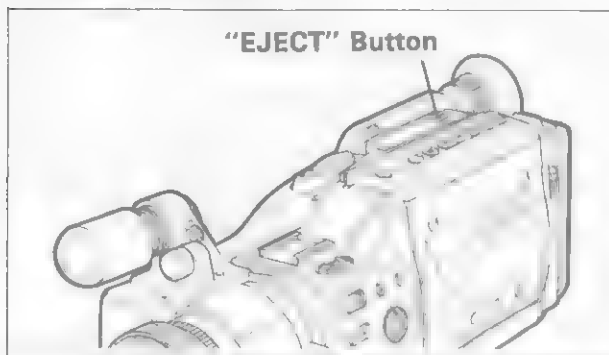


## INSERTION AND REMOVAL OF CASSETTES

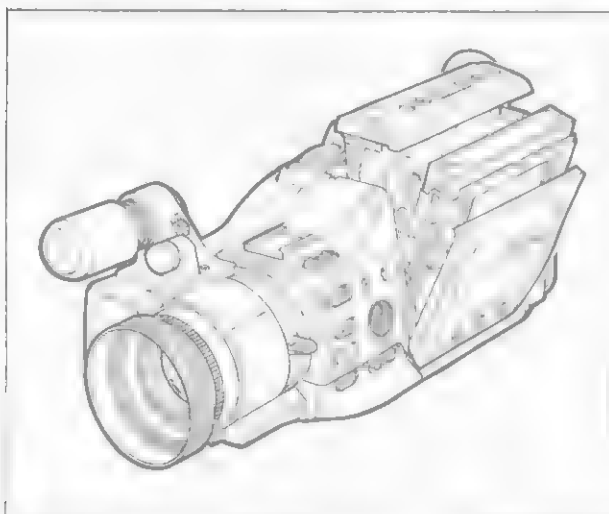
Before inserting or removing a cassette, be sure to connect the power source. When a power source is connected, the cassette can be ejected and removed whether the power is on or off.

### ■ Insertion

1. Press the "EJECT" button.  
The cassette door will open.



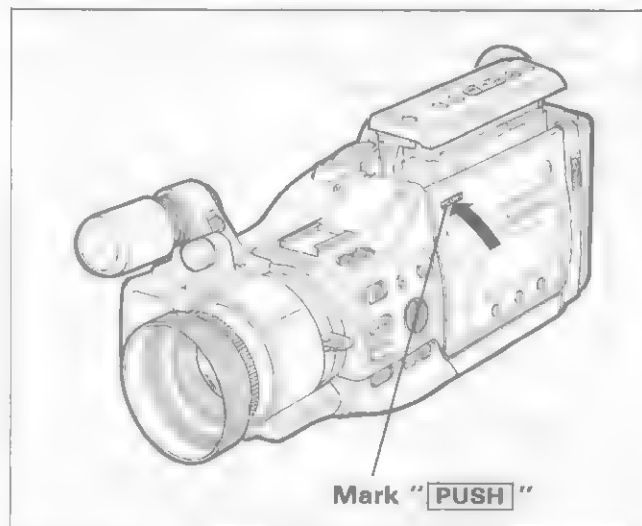
2. Insert a cassette so the transparent window is toward you and the arrow toward the cassette holder. Slide the cassette into cassette holder as far as it will go.



3. Press the cassette holder.

Push the section marked "**PUSH**" of the holder until a click is heard.

The camera/recorder will automatically close the top of the cassette compartment. Do not press the door down, or you may damage your camera/recorder.

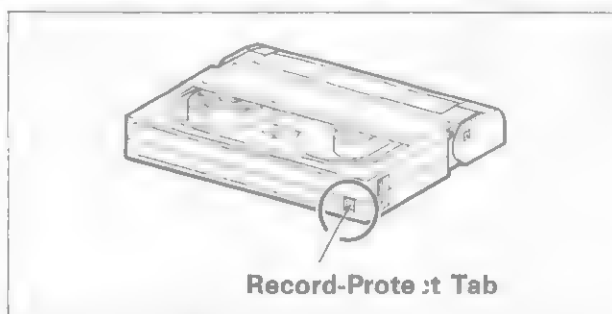


### ■ Removal

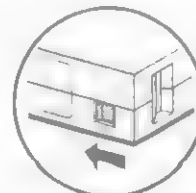
Press the "EJECT" button and remove the cassette.

### 8mm Video Cassette

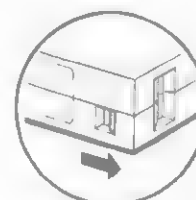
An 8mm Video Cassette has a record-protect tab on the side of the cassette that can be slid to prevent accidental erasure of recorded material.



To prevent accidental erasure, slide the record-protect tab in the direction of the arrow until the red tab is completely visible.



To record on the cassette again, slide the record-protect tab in the direction of the arrow. The red tab will disappear behind the cassette case.





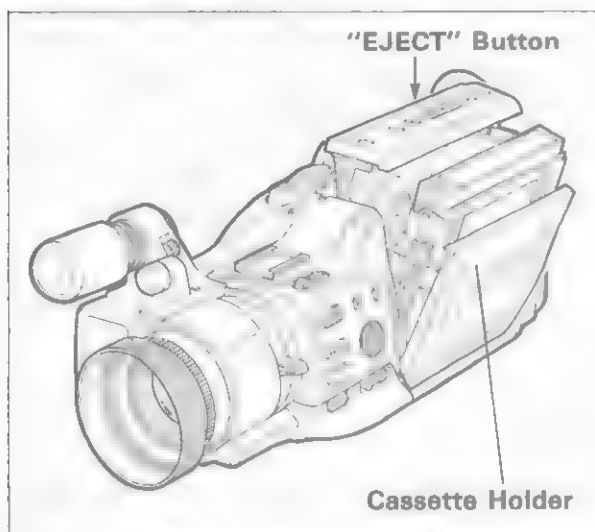
## MAKING A SAMPLE CAMERA RECORDING

1. Connect the POWER SOURCE. (See pages 9 through 11.)

2. Press "EJECT" button and insert the cassette so the transparent window is toward you and the arrow toward the cassette holder. Slide the cassette into cassette holder as far as it will go.

**NOTE:** If the power source is not connected to camera/recorder, the cassette holder will not open.

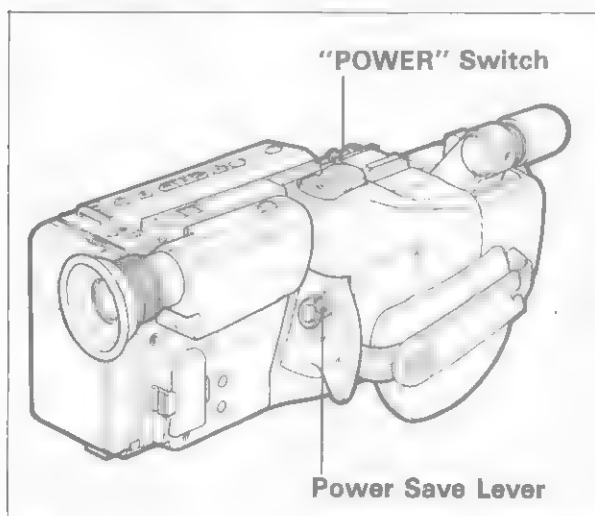
3. Press the cassette holder. The holder will latch in the operating position.



4. Set the power save lever to "NORMAL".

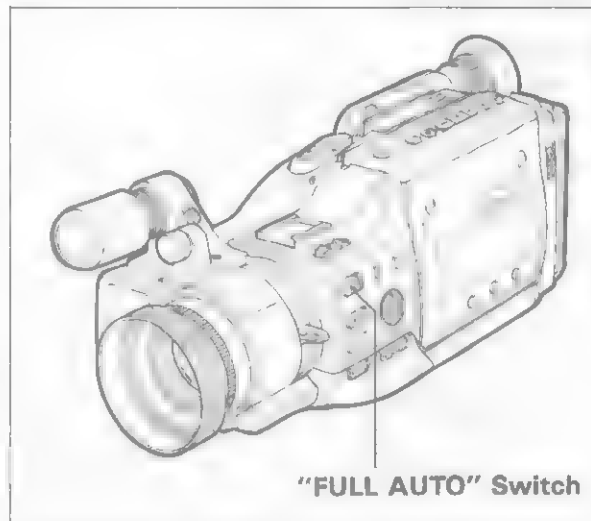
5. Slide "POWER" switch to on. The camera/recorder will enter record/pause mode automatically.

**NOTE:** If the red record-protect tab on the cassette is closed or no cassette is inserted, the "TAPE" indication in the viewfinder flashes for several seconds and the camera/recorder will not enter record/pause mode.



6. Set "FULL AUTO" switch to "ON".

**NOTE:** See page 28 for "EYEPIECE ADJUSTMENT".

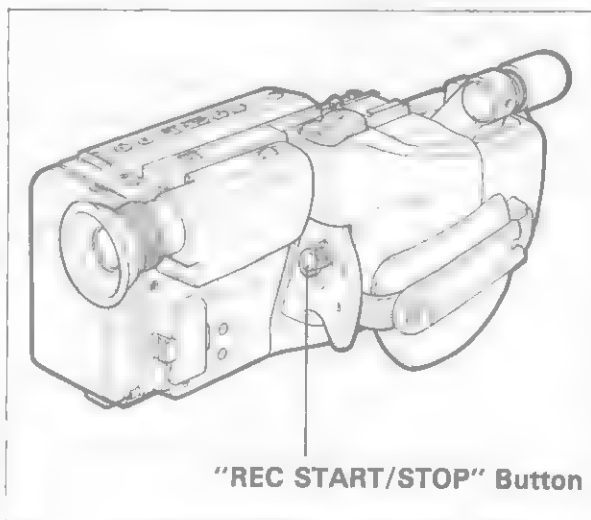


7. Now, press "REC START/STOP" button to start shooting the picture. "REC" indication appears in the viewfinder and you are now recording the picture you see through the viewfinder.

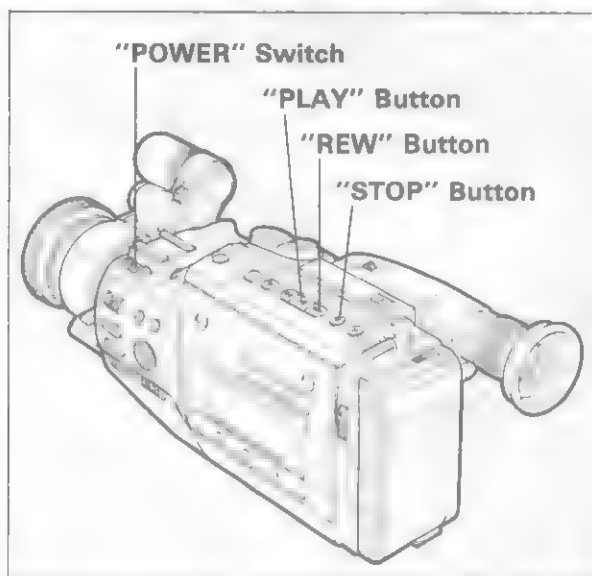
8. Press "REC START/STOP" button to stop recording. Press the button again to resume recording. The "PAUSE" indication in the viewfinder appears instead of "REC" in the record/pause (stand-by) mode.

### NOTES:

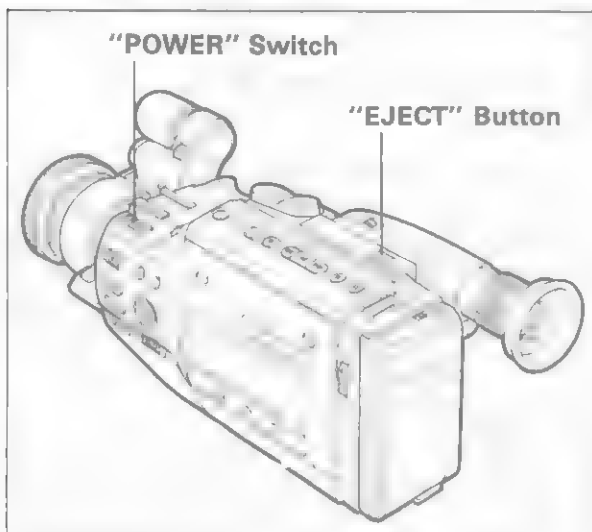
- The "TAPE END" indication in the viewfinder starts flashing when there is less than three minutes recording time left on the cassette.
- If the record/pause mode continues for more than 5 minutes, the camera/recorder's power is automatically turned off. To turn on again, press "REC START/STOP" button. The camera/recorder enters record/pause (stand-by) mode.



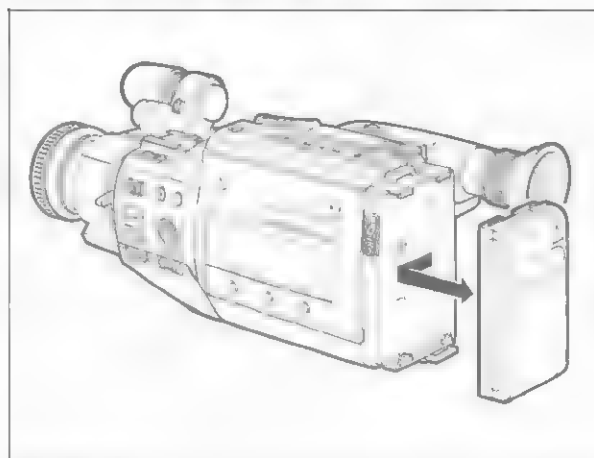
9. After recording, slide **"POWER"** switch to **"VCR"**, and the camera/recorder will be now in the stop mode.
  10. Press **"REW"** button. The tape will be rewound to the beginning.
  11. Press **"PLAY"** button. The picture you just recorded will be seen through the viewfinder and sound can be heard by earphone (Not supplied).
- NOTE:** If you connect the camera/recorder to your TV, you can see the picture played back on your TV. Refer to **"VIEWING THE PICTURE PLAYED BACK ON YOUR TV"** on page 34.
12. After playing, press **"STOP"** button.



13. Slide **"POWER"** switch to **"OFF"** and then press **"EJECT"** button to remove cassette.



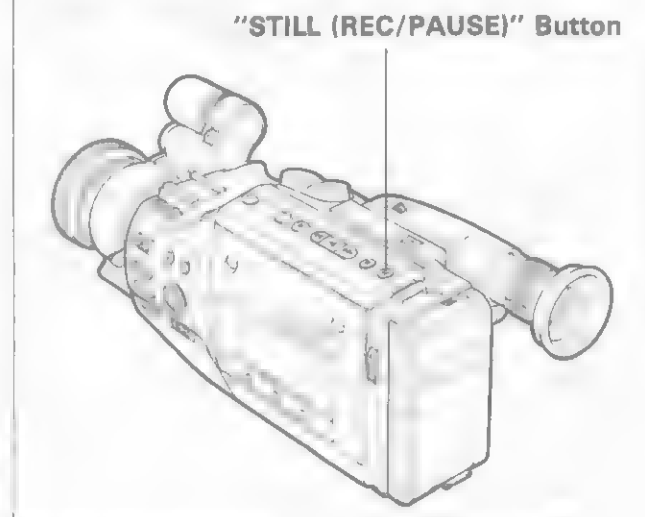
14. Always remove the power source from the camera/recorder after use.



**NOTE:** If you have a cassette tape that has already been partially recorded on and you want to record the remaining blank section, see **"QUICK EDIT"** on page 37.

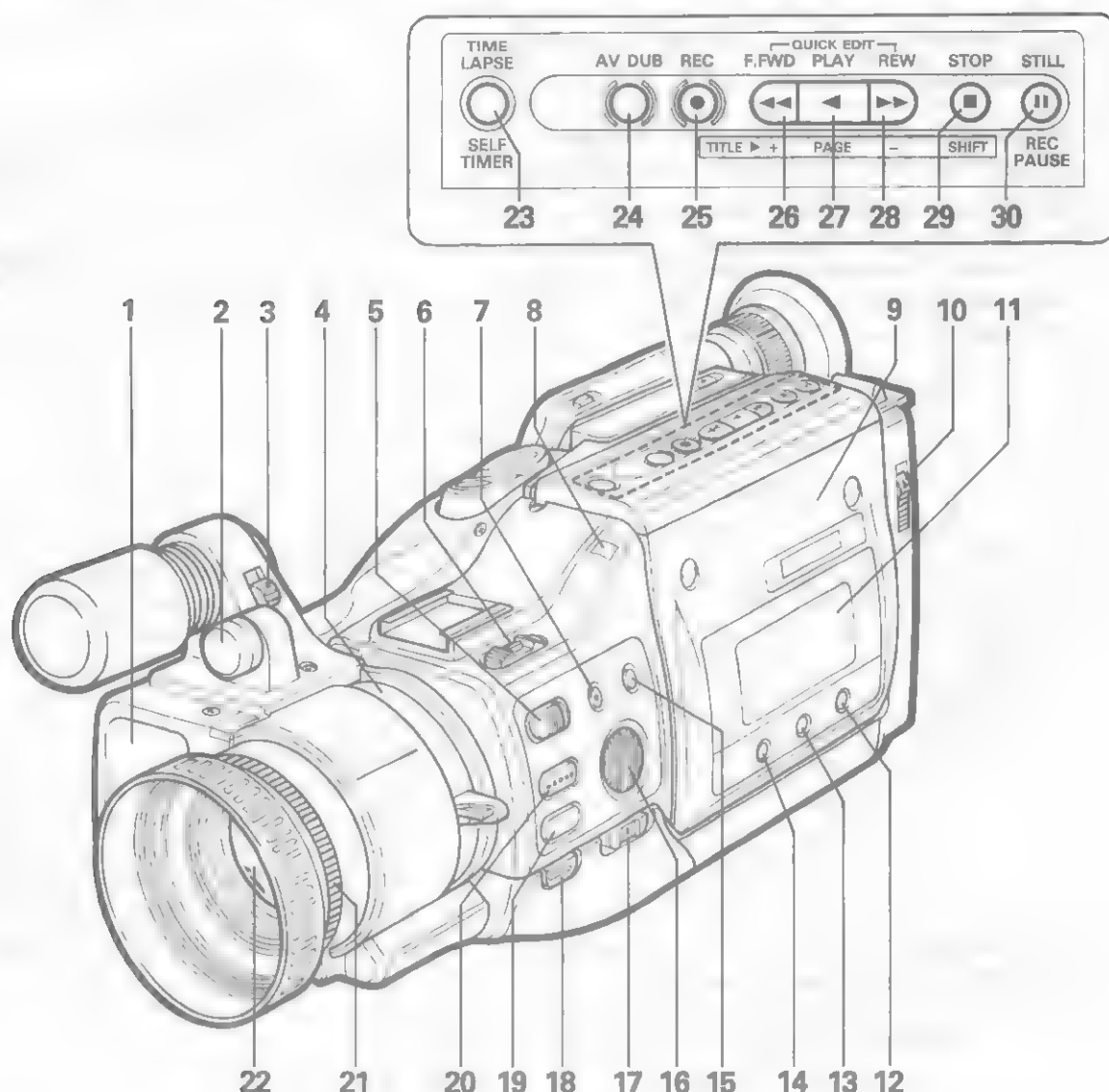
#### ■ Important Note

The **"STILL (REC/PAUSE)"** button on the top of the camera/recorder operates in the same way as the **"REC START/STOP"** button (during camera recording). You can press the **"STILL (REC/PAUSE)"** button in place of the **"REC START/STOP"** button in the following pages.





# IDENTIFICATION AND OPERATION OF CONTROLS



## 1. Auto Focus Window

To automatically focus the camera's lens, this window transmits and receives infrared light which is reflected off the object. Make sure you don't obstruct this window when recording.

## 2. Infrared ray receiving section

Receives infrared rays from the remote control unit.

## 3. "MIC WIND/NORM" Switch

This switch is used to reduce noise that occurs due to wind. Place the switch in the **NORM** position for normal use.

## 4. Zoom Ring (Manual Zooming)

Use to control the zoom setting. For a given camera-subject distance, the subject will appear 8X larger at the tele position than at the wide position. Just rotate the zoom ring for a tele angle (T) or wide angle (W) picture. Macro close-up, as close as 1 cm from object, is feasible.

## 5. "FULL AUTO" Switch

When this switch is set to **"ON"**, the focus, shutter speed, iris and white balance are adjusted automatically.

To adjust these functions manually, set this switch to **"OFF"** and adjust the corresponding buttons and switches.

## 6. "POWER" Switch

This turns the camera/recorder on and off and also switches between the camera and VCR modes. Set the switch to **"CAM"** to turn the camera's power on and to **"VCR"** to turn the VCR's power. Press and hold the small red button in the switch to switch it.

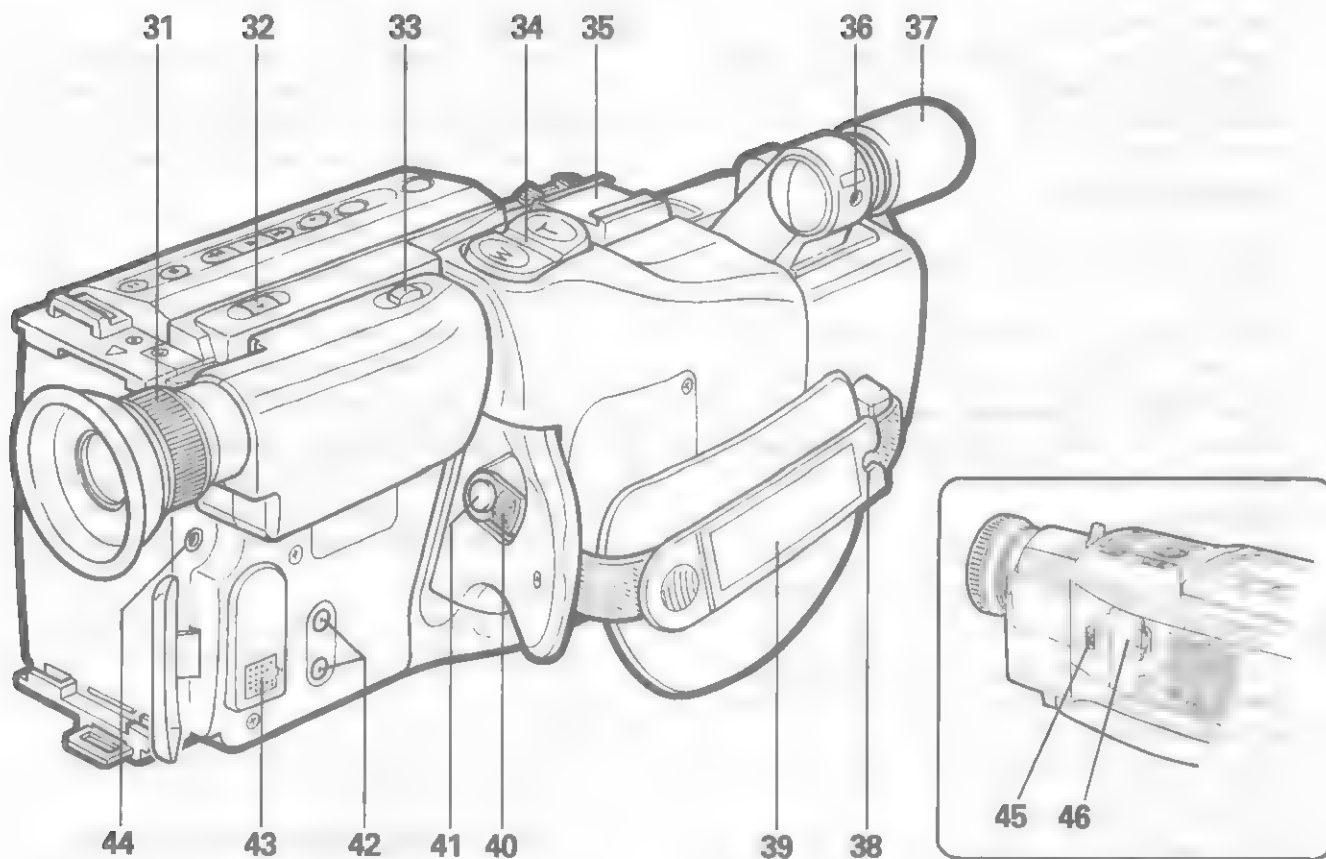
## 7. "DATE" Button

Press this button to display the date and clock in the viewfinder.

Whenever the date and clock appear in the viewfinder, they will be recorded on the tape.

8. **Record Indicator**  
Flashes for about 10 seconds when the **"TIME LAPSE/SELF TIMER"** button is pressed during record/pause (stand-by) mode and stays on to indicate recording starts.
9. **Cassette Holder**  
Press **"EJECT"** button to open the cassette holder. Be aware of the cassette direction when inserting.  
**NOTE:** Power source must be connected to open the cassette holder.
10. **"BATTERY" Release Lever**  
Releases the battery, AC adapter/charger or battery housing attached to the camera/recorder.
11. **LCD Panel**  
When the power is turned on, the LCD panel displays various modes. See page 33 for details.
12. **"TITLE" Button**  
Press this button to create and record personalized titles on your videos with the camera/recorder's built-in titler.  
(See **"TITLE RECORDING"** on page 32.)
13. **"RESET" Button**  
When the linear time counter is displayed in the viewfinder, pressing this button resets the counter to "0:00:00".
14. **"DISPLAY" Button**  
When this button is pressed, the displays in the viewfinder and LCD panel will change in sequence.
15. **"REVIEW" Button**  
Used to review the last few seconds of the recorded segment in the record/pause mode.
16. **"IRIS" Control**  
With this control in the center click position, or when the **"FULL AUTO"** switch is set to **"ON"**, the camera/recorder automatically adjusts the lens opening for the best picture in normal conditions. The auto iris system can also be adjusted to compensate for unusual lighting. When the subject is in bright light and the background is dark, set the **"FULL AUTO"** switch to **"OFF"** and then turn this control counterclockwise to close the lens iris opening. When the background is in bright light and the subject appears too dark, turn the control clockwise to open the lens iris.
17. **"FOCUS" Switch**  
Set this switch to the **"AUTO"** position for automatic focusing, and to the **"MAN"** position for focusing with the focus ring.  
Auto focusing can also be performed during the manual focus mode by pressing and moving this switch to the left.
18. **"FADE" Button**  
During recording you can add a professional touch to your recordings by fading in and out of scenes.  
**NOTE:** When you use **"FADE"** button to fade in and out, the sound will also fade in and out with the picture.
19. **"WHITE BAL" Button**  
When the **"FULL AUTO"** switch is set to **"ON"**, the color balance is set automatically. Set the **"FULL AUTO"** switch to **"OFF"**, and then press this button to adjust the color balance to suit for your personal preference. (See page 25).
20. **"SHUTTER" Speed Control Button**  
Used to control the shutter speed during recording and/or record/pause (stand-by) mode. (See **"VARIABLE SHUTTER SPEED"** on page 24.)
21. **Focus Ring**  
Do not attempt to manually turn the focus ring when the camera/recorder is in the auto focus mode.
22. **Lens**  
F1.4 (8.7 ~ 70 mm) 8:1 power zoom lens features auto focus and auto iris functions.
23. **"TIME LAPSE/SELF TIMER" Button**  
This button is used when performing self-timer, time lapse and one-shot recording. See pages 28 and 29.
24. **"AV DUB" Button**  
This button is used to record new audio and video in place of existing audio and video. See page 30.
25. **"REC" Button**  
Use this button to record pictures from an external input connected to the **"AV IN/OUT"** jack. This can be used as a record button only when the **"POWER"** switch is set to **"VCR"**.
26. **"F.FWD" Button**  
Press this button during stop or rewind mode, and fast-forwarding starts. **"FAST FWD"** indication appears in the viewfinder whenever the tape counter or time remaining is present.  
Press the button during playback of tape, and the tape is played back in the forward direction approximately 9 times faster than the normal speed to confirm the recorded content.  
Press **"PLAY"** button to return to normal playback mode or press **"STOP"** button to stop tape movement.  
**NOTE:** You can also visually scan forward when the camera/recorder is record/pause (stand-by) mode by pressing and holding this button.





## 27. "PLAY" Button

Used for playback of tape.

**NOTE:** When the camera/recorder is record/pause (stand-by) mode, pressing and holding this button will play the tape at normal speed.

## 28. "REW" Button

Press this button during stop or fast forward mode, and fast-rewinding starts. "REWIND" indication appears in the viewfinder whenever the tape counter or time remaining is present. Press the button during playback of tape, and the tape is played back in the rewind direction approximately 7 times faster than the normal speed to confirm the recorded contents.

Press "PLAY" button to return to normal playback mode or press "STOP" button to stop tape movement.

**NOTE:** You can also visually scan backward when the camera/recorder is record/pause (stand-by) mode by pressing and holding this button.

## 29. "STOP" Button

The "STOP" button is used to stop playback, rewind, and fast forward operations. The "STOP" button has no effect during camera record operation.

## 30. "STILL (REC/PAUSE)" Button

When this button is pressed during recording, the tape stops and the camera/recorder enters the record/pause (stand-by) mode. When this button is pressed again, the tape runs to resume recording. This button may be also used to display a still picture during playback mode.

## 31. Diopter Control

To use the electronic viewfinder without eye-glasses on, turn this control ring for your optimum focus adjustment.

## 32. "EJECT" Button

Operates with "POWER" either on or off, if a power source is connected to the camera/recorder.

### 33. "EVF RELEASE" Button

Press and hold this button to release or to set the EVF (Electronic Viewfinder) back to its original position.

### 34. Power Zoom Switch

This switch performs zooming electrically.

"W": Picture becomes wider gradually.

"T": Picture becomes telescopic gradually.

### 35. Accessory Shoe

Used to attach the lightweight video accessory.

### 36. "MIC" Jack

Connect an external microphone here to record sound from the external microphone.

**NOTE:** Connecting an external microphone automatically switches off the built-in microphone.

### 37. Microphone

Sensitive to source coming from the direction in which the camera is pointed.

### 38. Lens Cap Tab

Place the lens cap on this tab when you are ready to record a scene. The tab also prevents the lens cap from swinging around on its cord.

### 39. Hand Strap

Adjust to best fit to your hand.

### 40. Power Save Lever

When the "POWER" switch is set to "CAM", this lever turns the camera's power on and off. This is convenient during camera recording because it is not necessary to set the "POWER" switch to "OFF" when you want to turn camera's power off and then on again.

### 41. "REC START/STOP" Button

This button is used to control the camera/recorder. When this button is pressed with the camera/recorder set to the recording mode, the tape runs to start recording. "REC" appears in the viewfinder.

When this button is pressed again, "PAUSE" appears instead of "REC" and the tape stops and the camera/recorder enters the record/pause (stand-by) mode.

### 42. "DATE/TIME" Set Buttons

These buttons are used to set the clock (time and date) in your camera/recorder so it can be recorded on your tapes for future reference. (See page 20.)

### 43. "AV IN/OUT" Jack

Use the RF output adapter (Accessory No. 4) or the AV output cord (Accessory No. 13) to connect this jack to a TV to view the pictures played back by the camera/recorder.

Use the AV input cord (Accessory No. 1) to connect this jack to a TV or VCR to record pictures from the VCR or TV.

### 44. "PHONE" Jack

Sound being recorded by the microphone or played back may be monitored by attaching earphone (Not supplied) to this jack.

### 45. "NEG/POS" Switch

- Normally set to "POS".
- Set to "NEG" for special effects as in a negative film.

### 46. Clock Battery Compartment

Pull the tab to open the cover and install the clock battery (provided).

#### CAUTION:

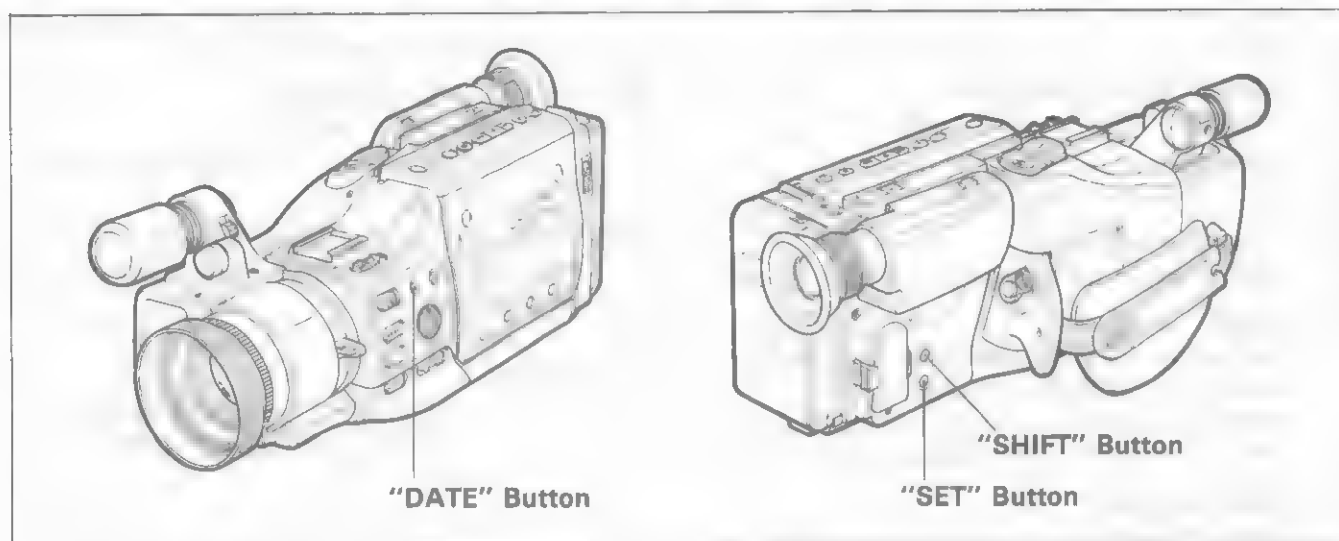
Do not hold the unit by the electronic viewfinder when carrying as this could cause a malfunction.



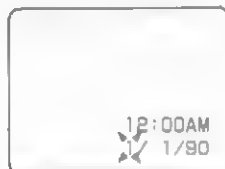


## DATE/CLOCK SETTING

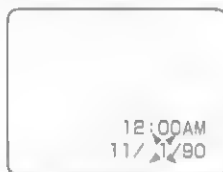
The date and clock can be recorded on your tapes to act as a handy reference when viewing them at a later time. Use the following procedure to set up this display for the current date and time.



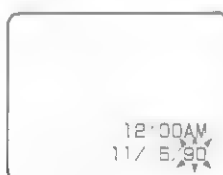
1. Load the camera/recorder's date/clock battery as described on page 8.
2. Slide the "POWER" switch to "CAM" while holding the small red button in the "POWER" switch down.
3. Place the power save lever to "NORMAL".
4. Press "DATE" button.  
Date and time appear in the viewfinder and "1" flashes.



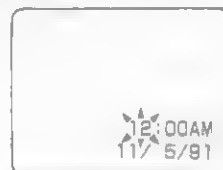
5. Press "SET" button to select correct month. Hold button down to advance rapidly. When the correct month appears, press "SHIFT" button.



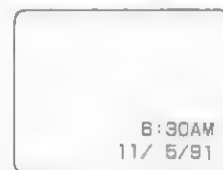
6. Press "SET" button to select correct date. Hold button down to advance rapidly. When the correct date appears, press "SHIFT" button.



7. Press "SET" button to select year, and then press "SHIFT" button.



8. Press "SET" button as many times as may be required to select correct hour, and then press "SHIFT" button.
9. Repeat steps 8 to select minute and AM/PM.

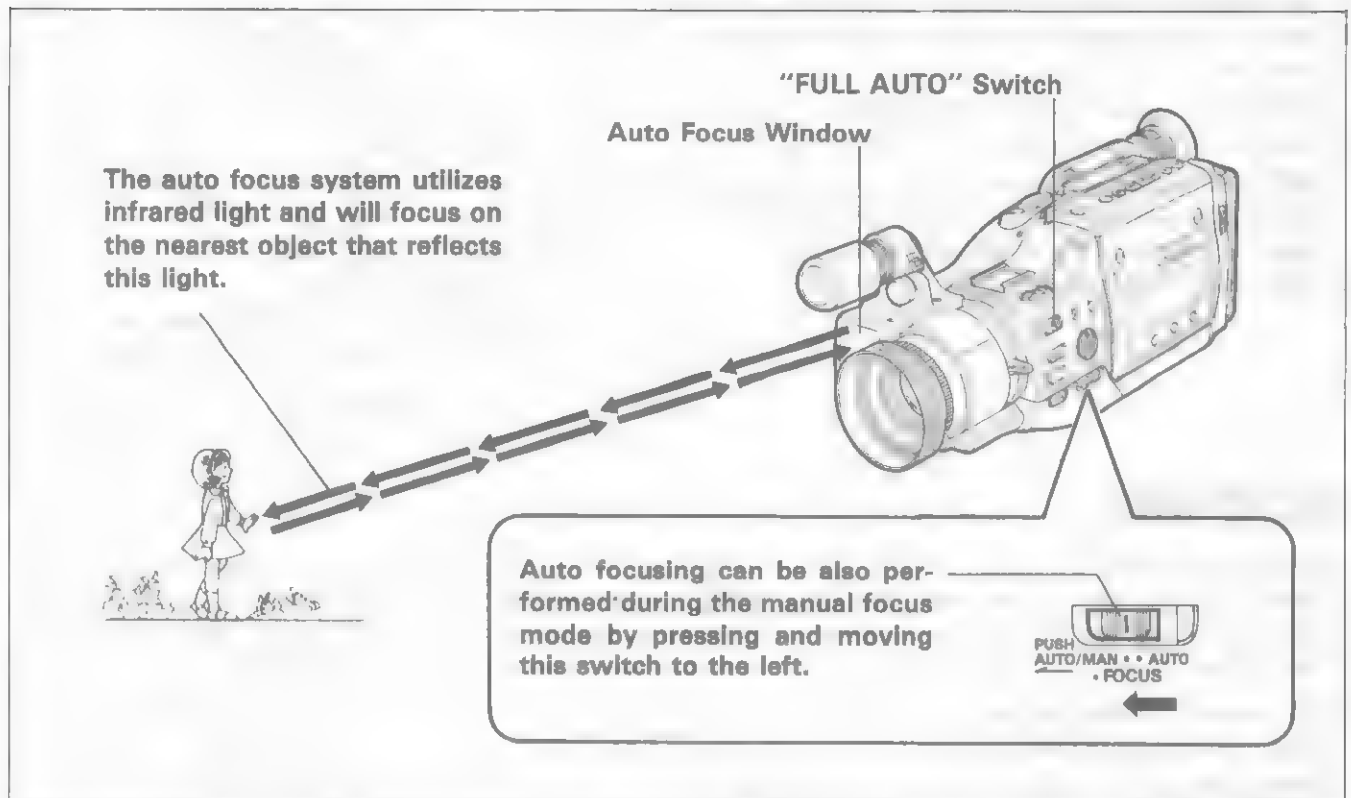


10. After setting AM or PM, press "SHIFT" button again to erase the flashing cursor and start the internal clock.

### NOTE:

- To correct date/clock information during programming or after starting the date/clock, press "SHIFT" button until the incorrect digit is flashing. Then use "SET" button to enter the correct digit.
- The date/clock graphics will be recorded whenever they appear in the viewfinder. To display date and clock together, press "DATE". To display date only, press "DATE" again. Pressing "DATE" a third time removes both graphics.

# AUTO FOCUS



With the **"FULL AUTO"** switch is set to **"ON"** or the **"FOCUS"** switch is set to **"AUTO"** position, ordinary objects are automatically in optimum focus.

## ■ OBJECTS HARD TO AUTO FOCUS

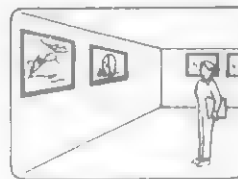
The distance between the auto focus window and the object is measured, and the focus ring is automatically turned for focusing. However, with the scenes such as shown below, the auto focusing may not operate properly, and manual focus must be performed. See next page.



1. Object is not in the center.



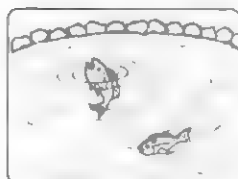
2. Object in far and near positions at the same time.



3. Object with continuous variation from far to near positions.



4. Object behind glass.



5. Black object or water which does not reflect infrared light.



6. Object always moving such as a crowd.



7. Object in the snow or fog.



8. Objects more than 50 feet away.



## ■ MANUAL FOCUS

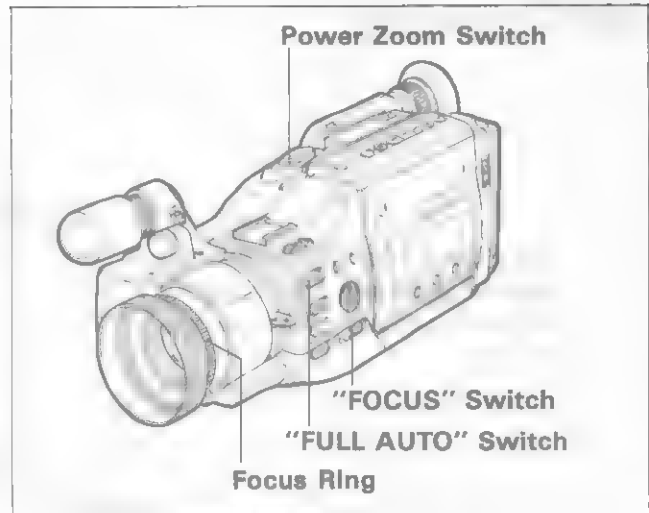
1. Set **"FULL AUTO"** switch to **"OFF"**.
2. Set **"FOCUS"** switch to **"MAN"** position.
3. Zoom in on the object by pressing the power zoom switch on the **"T"** side.

**NOTE:** See below for **"POWER ZOOM"**.

4. Focus on the object by turning the focus ring.

**NOTE:** If focusing is performed without zooming up first, the picture may become out of focus when the zoom-in is done during actual picture taking.

5. Then, zoom out from the object as desired.



## AUTO IRIS

This camera/recorder is provided with an auto iris mechanism which automatically adjusts the lens aperture in accordance with the incident light when the **"FULL AUTO"** switch is set to **"ON"** or the **"IRIS"** control is placed in AUTO (center) position. When the object is dark, the iris opens automatically, and it closes when the object is bright. When the power is switched off, the iris is automatically set to the fully closed position.

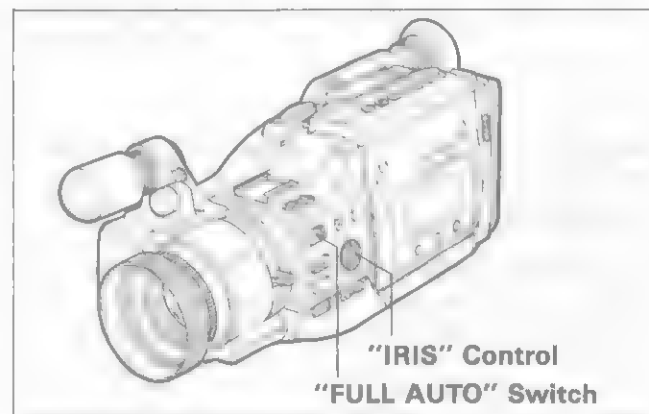
### ■ To manually adjust the iris

You can also adjust the iris manually.

- When the object is in bright light and the background is dark, set the **"FULL AUTO"** switch to **"OFF"** and then adjust the **"IRIS"** control counterclockwise to narrow the iris opening.
- When the background is in bright light and the object appears to be too dark, set the **"FULL AUTO"** switch to **"OFF"** and then adjust **"IRIS"** control clockwise to widen the iris opening.

### NOTES:

- The **"IRIS"** control has three click positions on either side of the center click position. Always set the **"IRIS"** control to a click position. If it is set to a position other than a click position, the iris cannot be corrected.



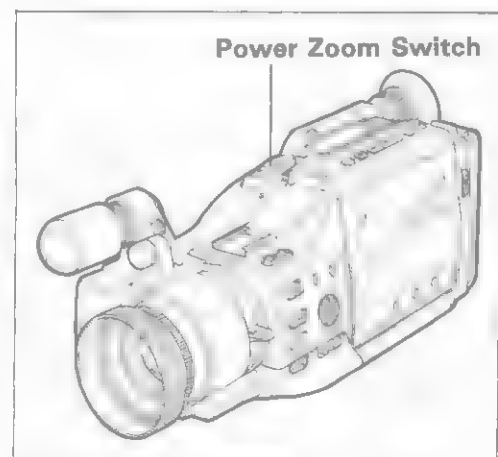
- After iris correction, set the **"FULL AUTO"** switch to **"ON"** or the **"IRIS"** control to the AUTO (center) position.

## POWER ZOOM

- Press power zoom switch on the **"W"** side, and the picture gradually widens.



- Press power zoom switch on the **"T"** side, and the picture gradually becomes telescopic.



## MACRO

It permits you to shoot objects as close as 1 cm from the lens tip.

1. Set "FULL AUTO" switch to "OFF".
2. Set "FOCUS" switch to "MAN" position.
3. Turn the zoom lever to "MACRO" while pressing "MACRO" switch.
4. Turn the zoom ring within the "MACRO" range (green line on the zoom ring) for focusing.

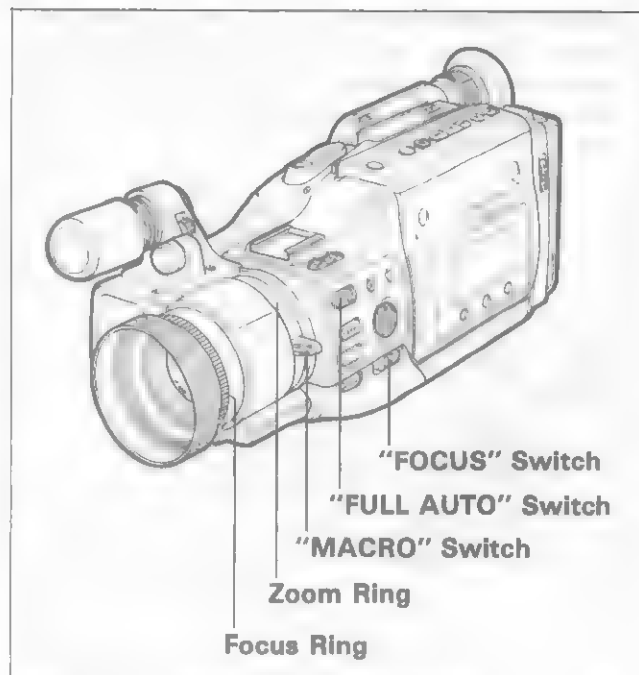
You can shoot objects at a distance with maximum magnification as follows.

This is convenient when shooting objects such as a butterfly on a flower as you cannot approach it too closely. You can shoot objects up to 2 feet (60 cm) from them.

1. Set "FULL AUTO" switch to "OFF".
2. Set "FOCUS" switch to "MAN" position.
3. Zoom up the object fully by turning the zooming lever.

**NOTE:** Turn the zoom lever to the telephoto end. When it is turned in the wide-angle direction from the telephoto end, the corners of the picture may become dim and blurred.

4. Focus on the object by turning the focus ring.



### NOTES:

- In either case, determine the size of the object by moving the camera backward and forward.
- Be careful as the lighting tends to be insufficient when shooting in the above conditions.
- Fix the camera on a tripod.

## FADE IN FADE OUT

This feature lets you add a professional touch to your home recordings. When you fade into a scene, the recording will start with a blank scene and the picture will gradually appear. The picture gradually disappears when fading out.

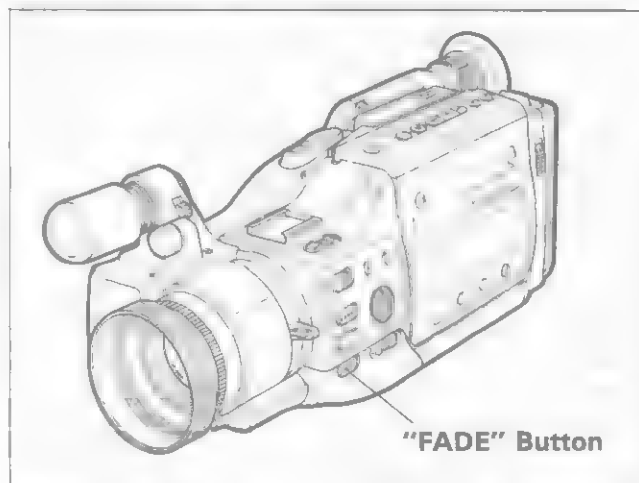
### ■ FADE-IN

1. Press and hold "FADE" button, and then press "REC START/STOP" button to start recording.
2. Release "FADE" button after a few seconds. The picture will gradually appear on a blank screen.

### ■ FADE-OUT

1. Press and hold "FADE" button during recording. The picture will gradually disappear from the screen.
2. Press "REC START/STOP" button to stop recording, and then release "FADE" button. The picture will reappear in the viewfinder.

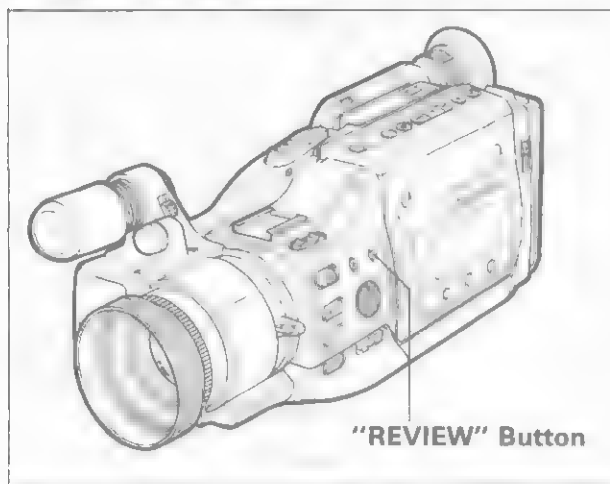
**NOTE:** Both picture and sound will gradually appear and disappear. The fade speed is automatically controlled by the camera/recorder.





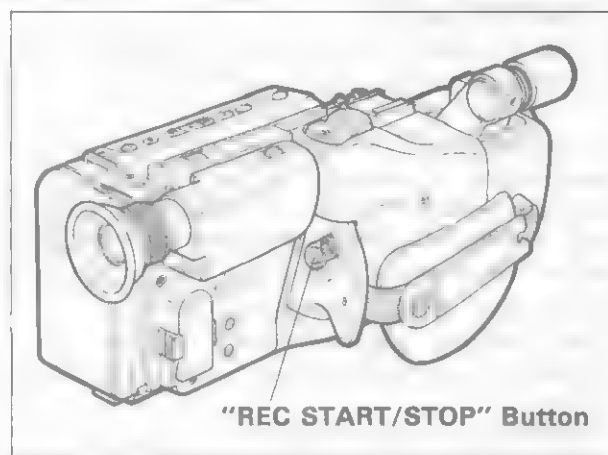
## INSTANT REVIEW

1. In record/pause (stand-by) mode, press **"REVIEW"** button, and the recorded scene of the last few seconds is played back in the reverse direction and then played back in the forward direction.



2. When the tape reaches the end of the scene you have just recorded, the camera/recorder returns to the record/pause (stand-by) mode.

Recording starts again when **"REC START/STOP"** button is pressed again.

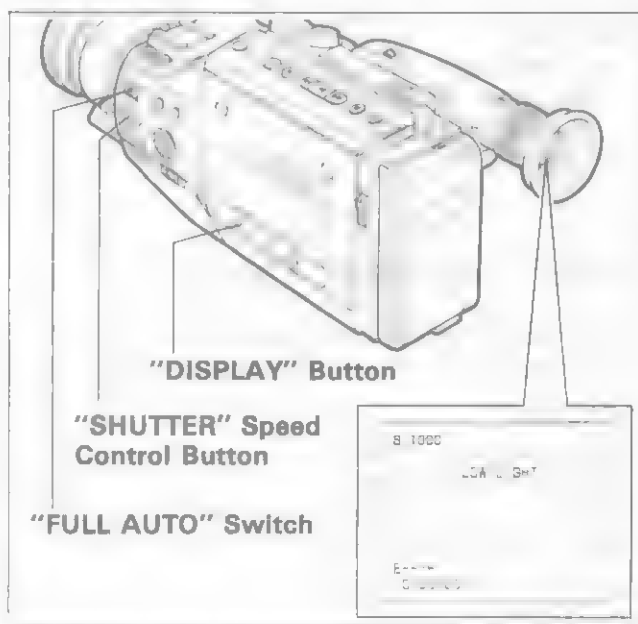


## VARIABLE SHUTTER SPEED

Use this feature to shoot tennis and golf shots that contain rapid movement. You can replay the still pictures at the crucial moments without any fluctuations.

Normally the program AE feature operates and selects the optimum shutter speed, 1/60, 1/120 or 1/250, according to the brightness of the subject when the **"FULL AUTO"** switch is set to **"ON"**. To increase the shutter speed, follow the procedure below.

1. In record/pause (stand-by) or record mode, press **"DISPLAY"** button to display battery level indicator in the viewfinder.
2. Set the **"FULL AUTO"** switch to **"OFF"** and then press the **"SHUTTER"** speed control button until the desired speed appears in the viewfinder. The speed changes from AE mode to 1/60, 1/120, 1/250, 1/1000, 1/2000, 1/10,000 and back to AE mode each time the button is pressed.  
For example, the speed is 1/1000 seconds, **"S:1000"** will be displayed in the viewfinder.
3. Press **"REC START/STOP"** button to start recording.



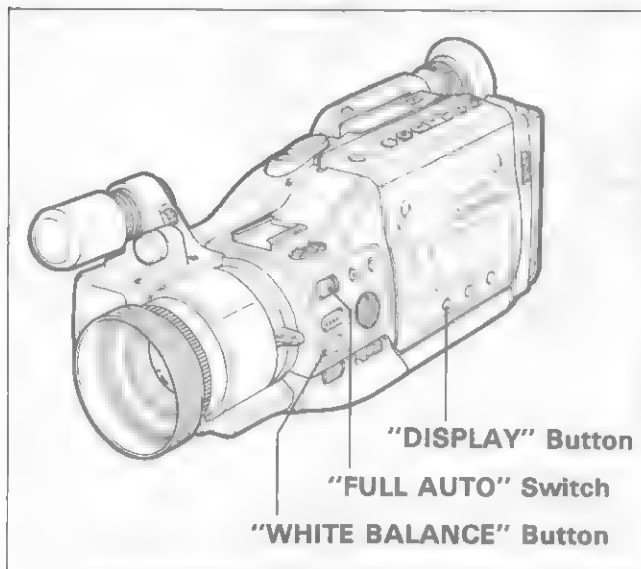
### NOTES:

- Shutter speed is also displayed in the LCD panel of the camera/recorder.
- After use, set the **"FULL AUTO"** switch to **"ON"**.
- When shooting at the 1/120, 1/250, 1/1000, 1/2000 or 1/10000 speed, more light is required because the pictures become darker than the normal shooting at 1/60 speed. When there is insufficient light, the **"LOW LIGHT"** indication appears in the viewfinder to warn you. In this case, reduce the shutter speed or use an additional light.

- When a tape that was recorded using the high speed shutter feature is played back, scenes changes will not be seen as a smooth motion.
- When the camera is pointed at an object that is moving rapidly, it may not be focused in the auto focus mode. In this case, focus manually.
- When recording with the illumination such as a fluorescent lamp, a mercury vapor lamp or a sodium lamp, the picture may become bright or dark (flickering).

## AUTO-WHITE BALANCE

Your camera/recorder is equipped with a constant automatic white balance system which will continuously maintain proper color balance when the **"FULL AUTO"** switch is in the **"ON"** position. **"AUTO"** is displayed only in the LCD panel.



### ■ To manually adjust the white balance

In most cases, the auto white balance function of this unit operates automatically. However, if it does not work correctly in the conditions listed below, adjust the white balance manually.

- When shooting outdoors, such as scenes after sunset or scenes before sunrise
- When shooting outdoors, such as a night view, neon sign or fireworks
- When shooting outdoors, green overwhelming on the screen
- When shooting a subject under a sodium lamp
- When shooting a subject under a mercury lamp
- When lighting conditions change quickly



To turn off the automatic system, set the **"FULL AUTO"** switch to **"OFF"** and then press the **"WHITE BAL"** button to set the indication to the existing lighting conditions. The indication displayed in the LCD panel and viewfinder changes between **"AUTO"**, **"☼"** and **"☀"** each time you press the **"WHITE BAL"** button.

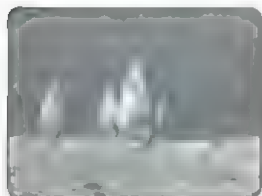
### NOTES:

- Return the **"FULL AUTO"** switch to **"ON"** after use.
- If no indication appears in the viewfinder, press the **"DISPLAY"** button.

## NEGATIVE/POSITIVE INVERSION

You can record a subject while inverting the colors and black/white as in a negative film.

- Set the **"FULL AUTO"** switch to **"ON"** to obtain a positive picture automatically.
- To obtain a negative picture, set the **"FULL AUTO"** switch to **"OFF"** and then set the **"NEG/POS"** switch located on the bottom to **"NEG"**.

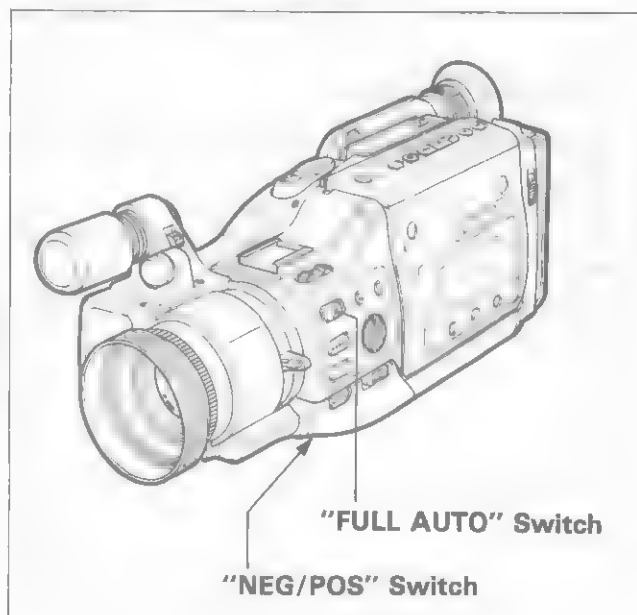


Positive picture



Negative picture

**NOTE:** Always return the **"NEG/POS"** switch to **"POS"** or **"FULL AUTO"** switch to **"ON"** after shooting.

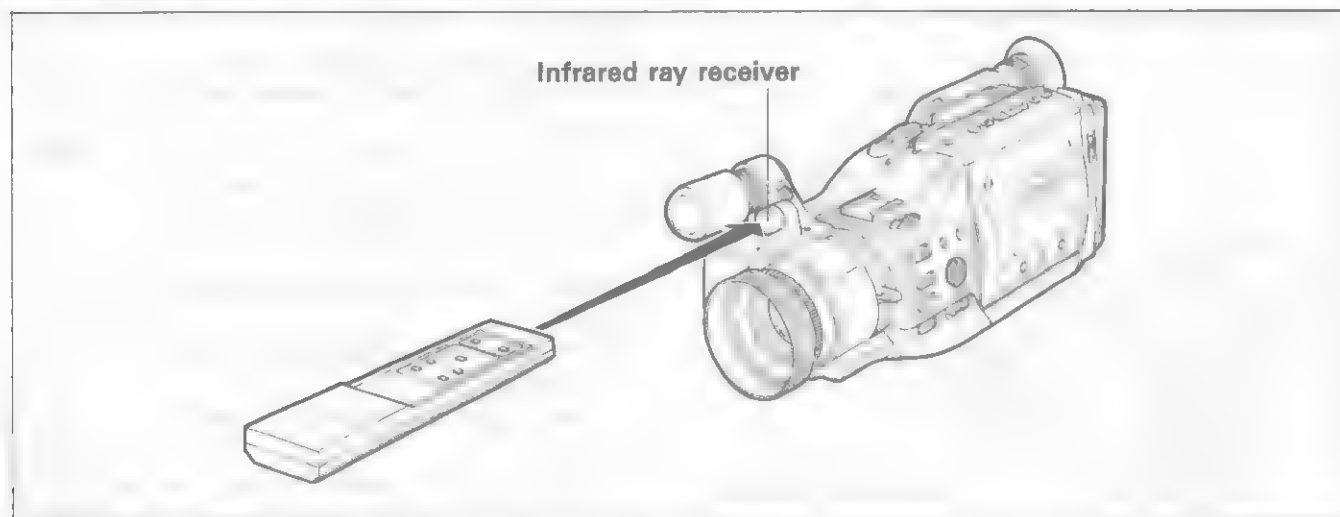


## WIRELESS REMOTE CONTROL

You can operate the camera/recorder with the wireless remote control (provided) from a distance.

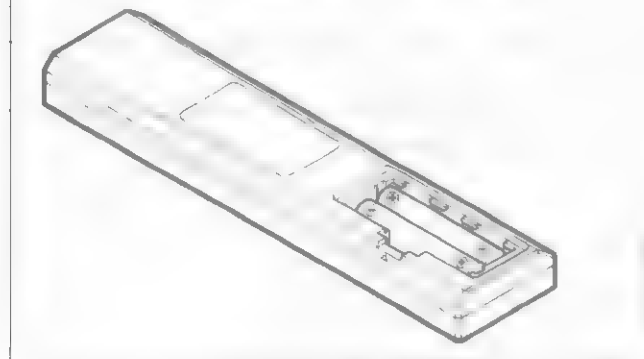
The buttons on the remote control have the same functions as the buttons with the same identifications on the camera/recorder.

Aim the remote control at the receiver of the camera/recorder.

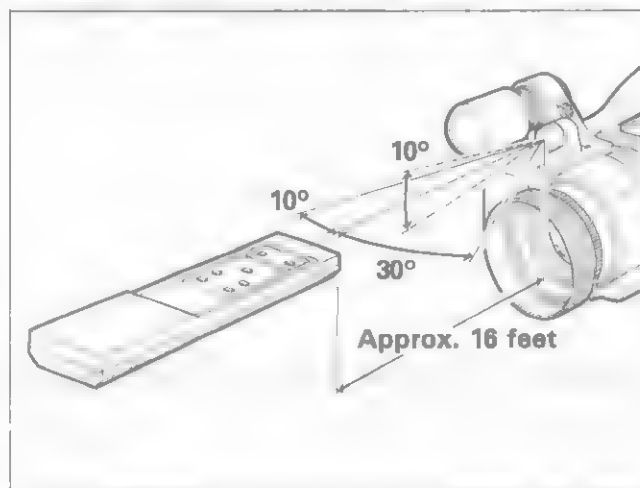


### ■ How to install the batteries

- Be sure to install two "AAA" size batteries before use.
- Be careful to install with correct polarity.



### ■ Remote controllable range



### Cautions on batteries

- Do not use the old and new batteries at the same time.
- Do not mix batteries of different types.
- Do not short, take apart or dispose of batteries by throwing into a fire.
- When liquid leaks, wipe it off completely and then insert new batteries.

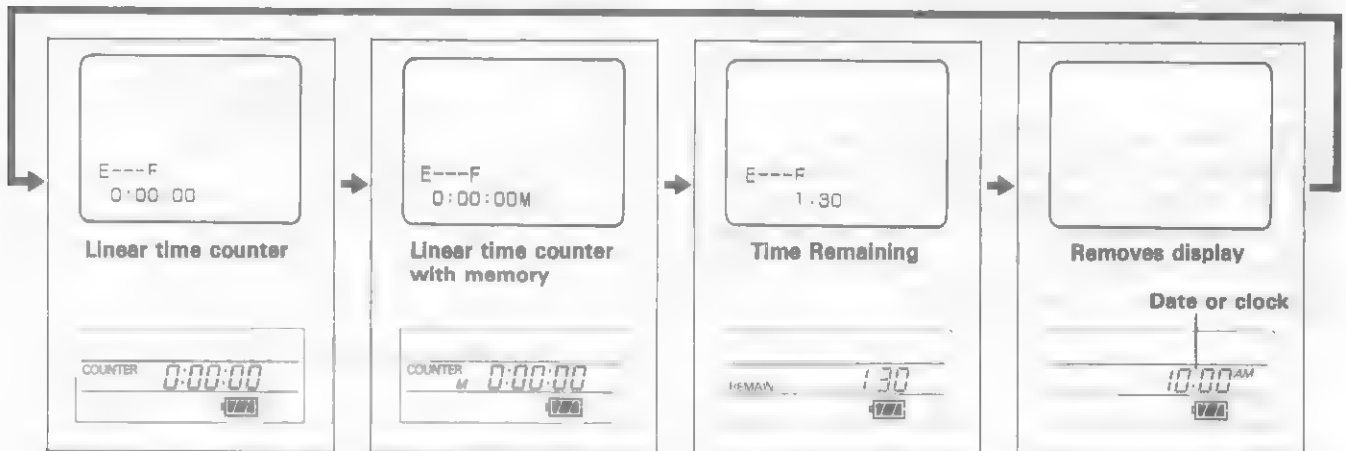
### Cautions on the remote control

- Use the remote control indoors. When the infrared ray receiver is exposed to direct sunlight or strong light such as that from artificial lighting, the remote control may not operate correctly.
- The remote control cannot be operated if there is an obstacle between the remote control and infrared ray receiver.
- The remote control code of this camera/recorder is "VCR2". If the remote control code of your VCR is the same, "VCR2", the VCR may malfunction when this remote control is used.
- When recording is started or stopped or play is switched to still play, the recording indicator lights momentarily; use this as a reference in operation.
- The start/stop button and pause button of the remote control have the same function. Therefore, after 5 minutes in the record pause mode, the power save function cannot be released by the remote control.



## DISPLAY BUTTON

When the "DISPLAY" button is pressed, the displays in the viewfinder and LCD panel will change as follows.



- The above figure shows when the power switch is set to "VCR".

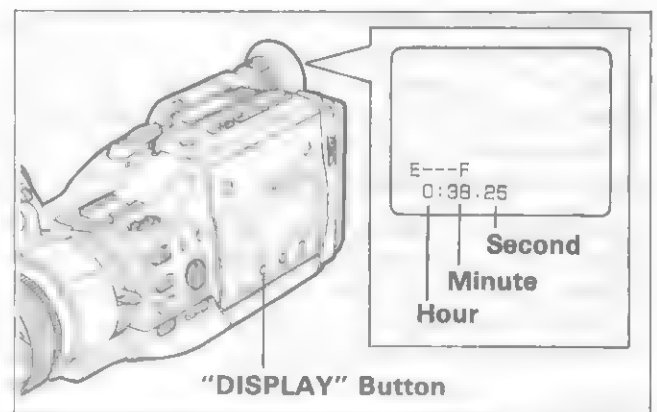
## LINEAR TIME COUNTER

Shows length of tape run in hours, minutes and seconds. Press "DISPLAY" button to select the linear time counter display.

Load a cassette into the camera/recorder and perform recording or playback; the counter indicates the elapsed time.

### NOTES:

- The linear time counter does not operate when nothing is recorded on the tape.
- Counter changes to 0:00:00 when cassette is ejected.

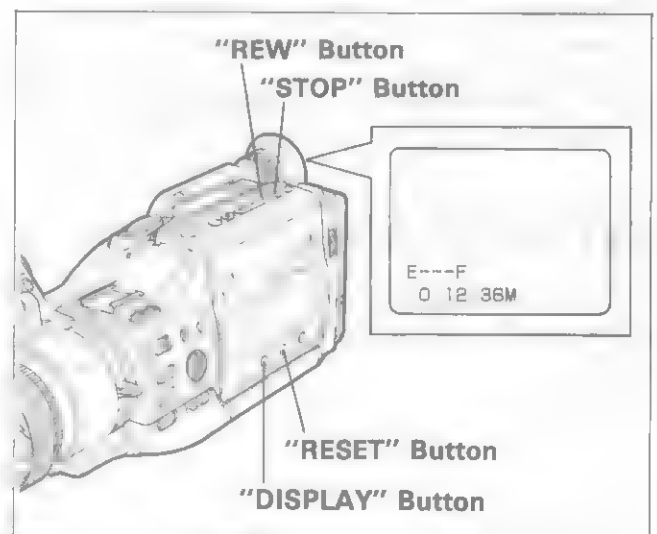


## MEMORY

When the linear time counter with memory indication appears in the viewfinder or the LCD panel, a tape that is being rewound automatically stops when the counter reads approximately "0:00:00". This is useful if there is a section of tape you want to review immediately after recording or if you want to return to the same point several times in a row.

1. Press "DISPLAY" button until the linear time counter with memory is displayed.
2. Start playing or recording a tape.
3. At the point you want playback to start, press "RESET" button to reset the counter to "0:00:00".
4. Continue to play or record.
5. Press "STOP" button.
6. Press "REW" button. The tape will be rewound to the preselected point, at approximately "0:00:00" indication.

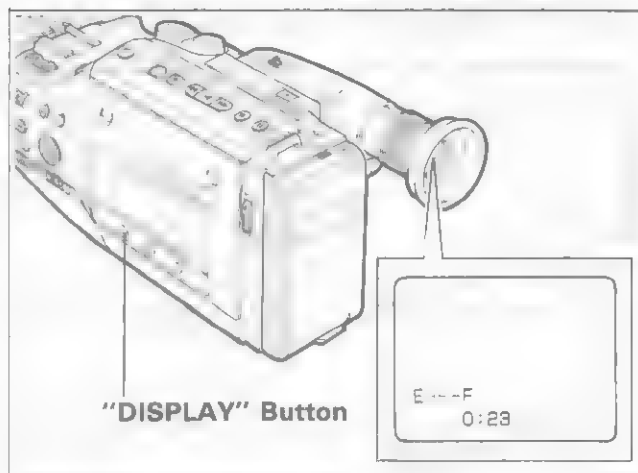
**NOTE:** The tape will also stop approximately at "0:00:00" during fast forward mode.



## TIME REMAINING

When the linear time counter with memory is present in the viewfinder and LCD panel, pressing **"DISPLAY"** button again will change the display to a read-out showing the amount of recording or playback time left on the tape.

**NOTE:** When using the E6-20 minutes tape or P6-20 minutes tape, you must press **"RESET"** button to display the **"E-20"** or **"P-20"** to adapt the camera/recorder's time remaining system for an accurate read-out. (If the counter is being displayed, **"RESET"** button resets the counter to **"0:00:00"**).



## SELF TIMER

The self timer allows you to automatically start recording after about ten seconds.

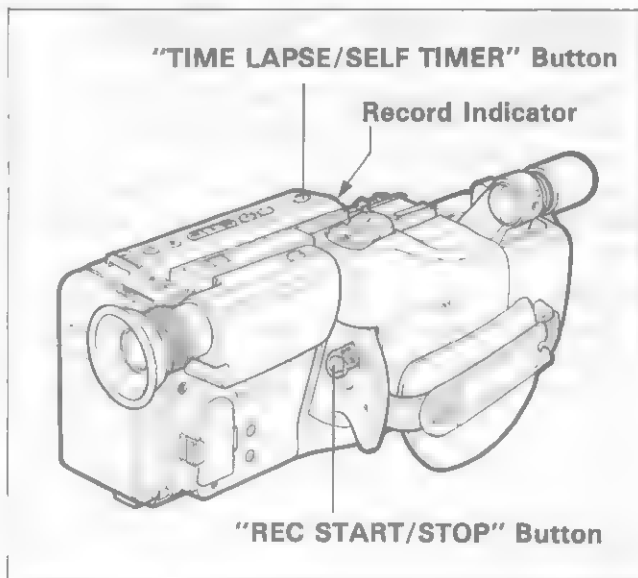
Press the **"TIME LAPSE/SELF TIMER"** button once while in the record/pause mode.

**"STNDBY"** appears in the viewfinder and the camera/recorder will automatically start recording after ten seconds when the button is pressed and will continue to record for approx. 30 seconds.

If you press the **"TIME LAPSE/SELF TIMER"** button twice, the camera/recorder will automatically start recording after ten seconds when the button is pressed and then recording will continue until the **"REC START/STOP"** button is pressed.

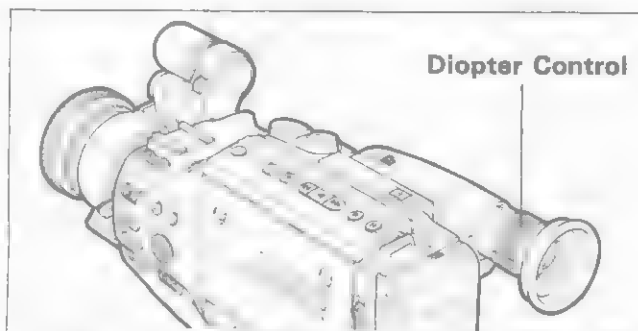
### NOTES:

- Record indicator flashes for about 10 seconds to indicate self timer mode when you press **"TIME LAPSE/SELF TIMER"** button and stays on during recording.
- Press the **"REC START/STOP"** button to release the self timer mode.
- The **"TIME LAPSE/SELF TIMER"** button has no effect during normal recording.



## EYEPIECE ADJUSTMENT

To use the electronic viewfinder without eyeglasses on, adjust the diopter control for optimum focus adjustment.



## TIME LAPSE RECORDING

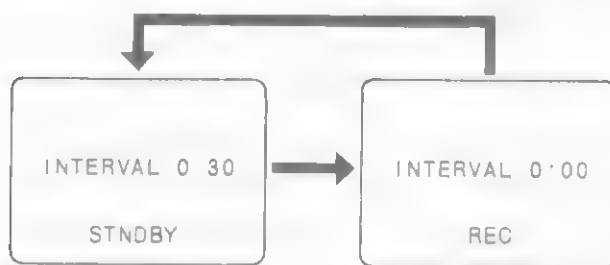
This function is convenient to record the blooming of flowers, etc. as it starts and stops recording at a predetermined interval.

For example, this function allows recording for one second after a pause of 30 seconds and repeats this procedure.

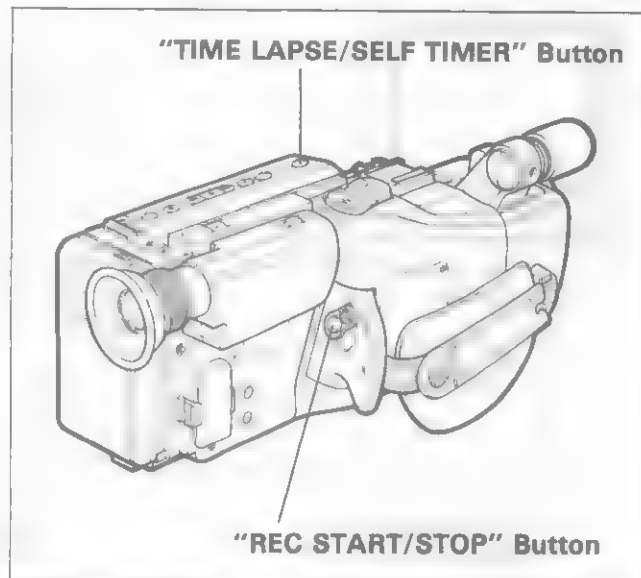
1. In the record/pause (stand-by) mode, press **"TIME LAPSE/SELF TIMER"** button repeatedly until the length of time you want between recordings appears in the viewfinder.
  - The interval is changed from **"STNDBY"** to **"STNDBY"**, 0:30 (30 seconds), 1:00 (1 minute), 2:00 (2 minutes), 5:00 (5 minutes), **MAN** (Manual) and again to **"STNDBY"** every time the button is pressed.



2. Press the **"REC START/STOP"** button.



- The clock starts counting, and when it reaches **"0:00"**, a recording is performed for a second, and then the record/pause (stand-by) mode is entered. After 30 seconds, recording is repeated for another second.



3. Press the **"REC START/STOP"** button to stop recording.

### NOTES:

- Do not continue to time lapse record for more than 48 hours.
- When you want to change the interval time after the interval clock has started, press the **"REC START/STOP"** button and then re-set the interval time.
- If **"MAN"** is selected for the interval time, one shot recording can be done. See below for operations.

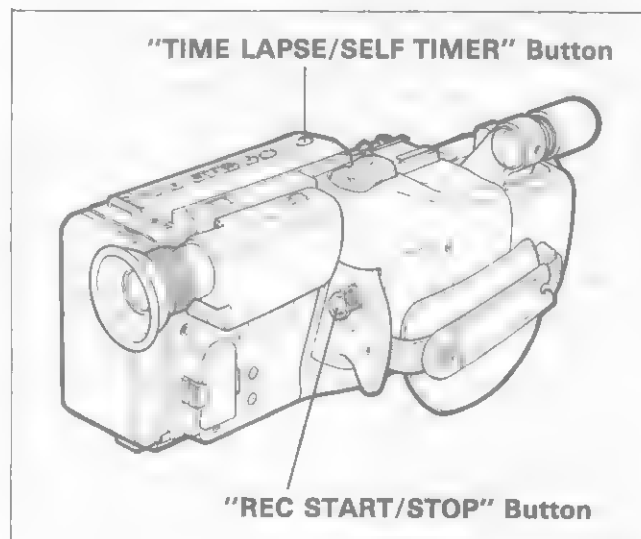
## ONE SHOT RECORDING

This function is convenient to produce an animated video.

One shot (a few frames) each is recorded every time the **"REC START/STOP"** button is pressed. Shoot a doll, etc. while moving it slightly between shots to produce an animated video of your own.

1. In the record/pause (stand-by) mode, press **"TIME LAPSE/SELF TIMER"** button repeatedly to select **"INTERVAL MAN"**.
2. Press the **"REC START/STOP"** button.
  - One shot (a few frames) is recorded every time the button is pressed.
3. Press the **"TIME LAPSE/SELF TIMER"** button so that **"INTERVAL MAN"** disappears to release the one shot recording.

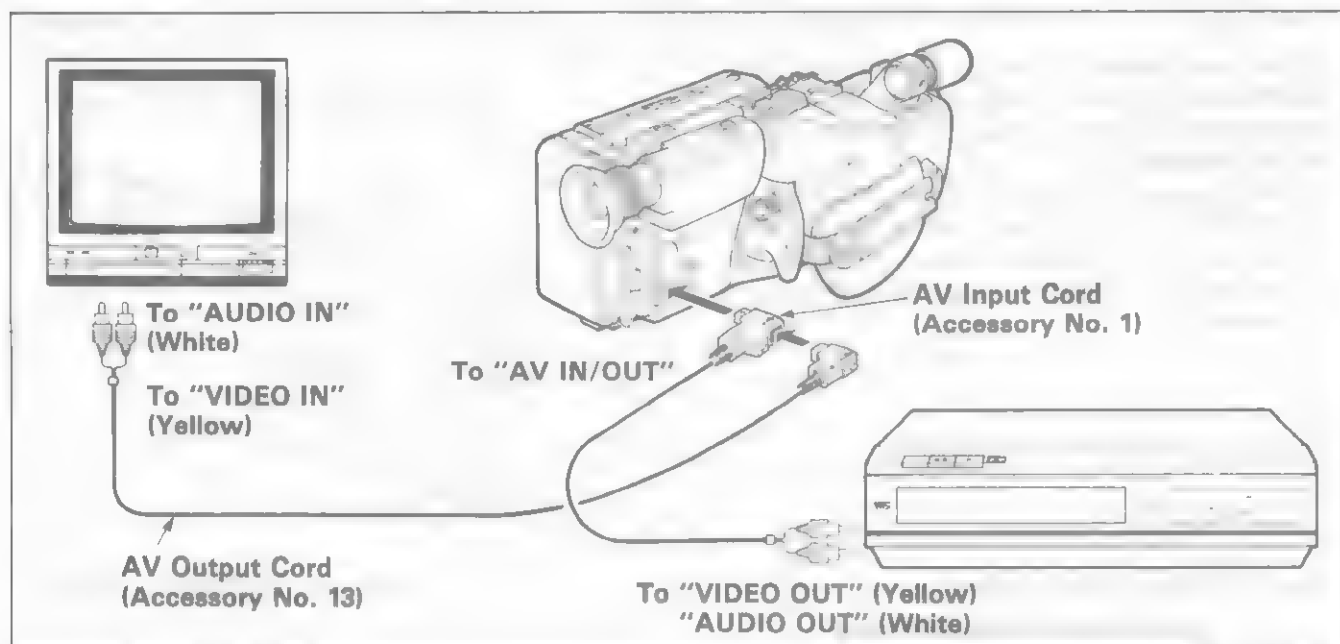
**NOTE:** If the record/pause mode continues for more than 5 minutes, the camera/recorder's power is automatically turned off. To turn on again, press **"REC START/STOP"** button.





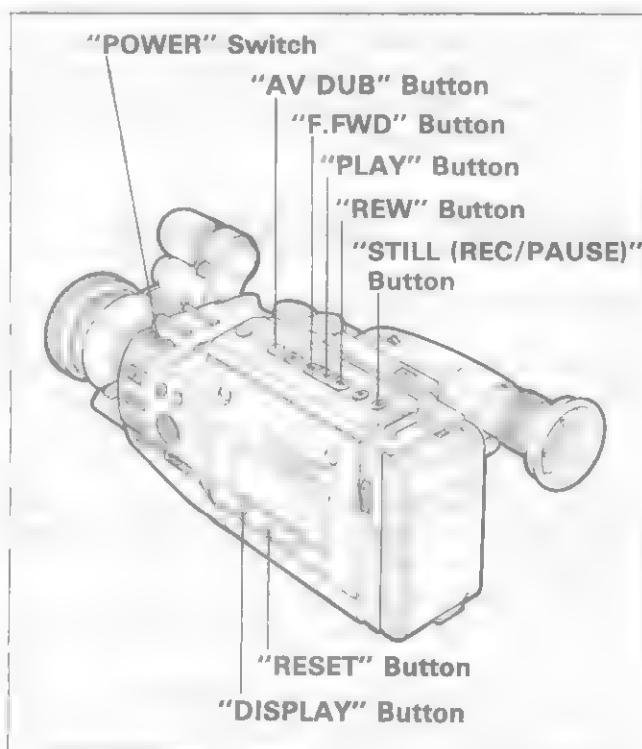
## AUDIO/VIDEO DUBBING

Audio/video dubbing lets you record new audio and video from another VCR on a previously recorded tape in the camera/recorder.



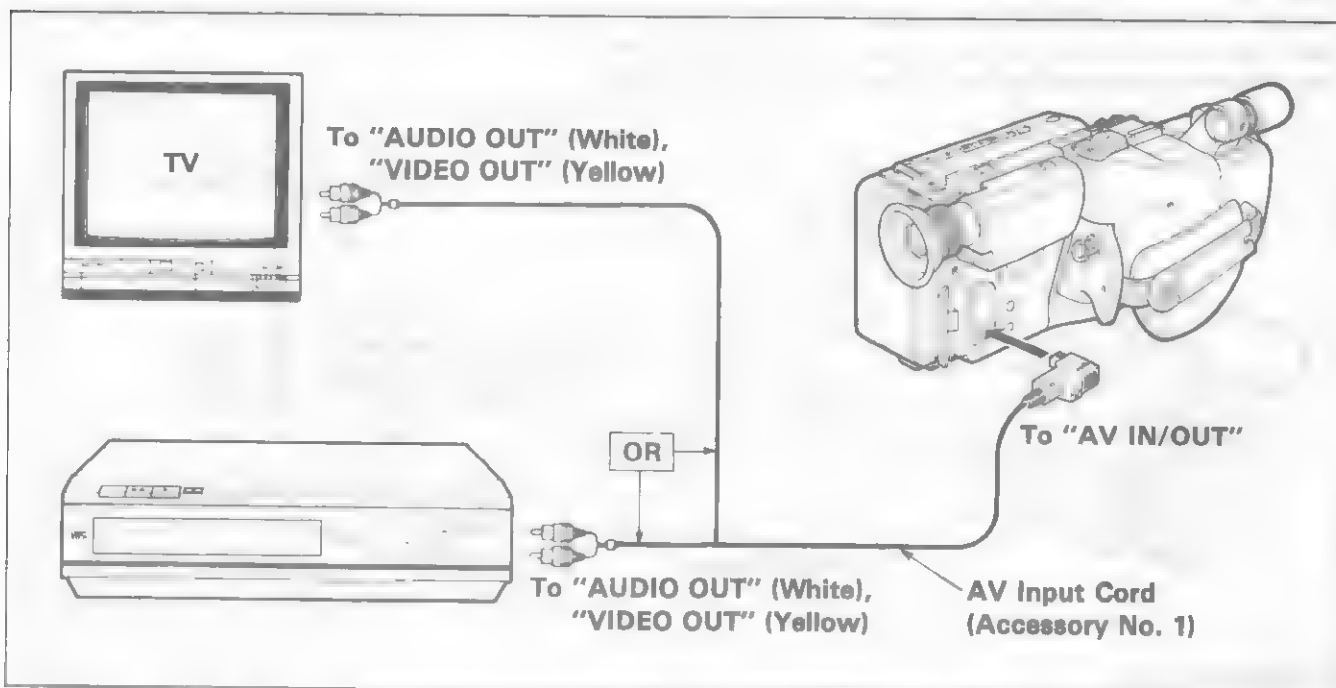
- NOTES:**
- If you connect only the video plug of the AV input cord to the VCR, there will be no sound in the dubbed portion.
  - If you connect only the audio plug of the AV input cord to the VCR, dubbing is impossible.
  - If no video and audio plugs are connected, new audio and video from the camera/recorder's built-in microphone and camera is dubbed onto the tape.
  - If the AV dub/pause mode continues for more than 5 minutes, the camera/recorder will automatically enter the stop mode to protect the tape from damage.

1. Insert a recorded tape.  
Be sure that the red record-protect tab is not closed.
2. Slide **"POWER"** switch to **"VCR"**.
3. Press **"PLAY"** button and then **"REW"** or **"F.FWD"** button to search to the approximate position of the tape on which you want to dub a picture.
4. Press **"PLAY"** button again to search the exact position where you stop dubbing and then press **"STILL (REC/PAUSE)"** button.
5. Press **"DISPLAY"** button so linear time counter with memory appears and then press **"RESET"** button to set the counter reading to **"0:00:00M"**.
6. Press **"REW"** button to rewind the tape to the approximate position from which you want to start dubbing.
7. Press **"PLAY"** button, and when the exact position from which you start to dub is reached, press **"PAUSE"** button.
8. Press and hold the **"AV DUB"** button, and then press the **"PLAY"** button. **"A/V DUB"** appears in the viewfinder, and at the same time the picture to be dubbed appears.
9. Press **"STILL (REC/PAUSE)"** button.  
A/V dubbing will start and will stop when the counter reads **"0:00:00"**.



## RECORDING TV PROGRAM

If your TV or VCR has video/audio out jacks, you can record the TV program with camera/recorder.



1. Connect the AV input cord to "AUDIO OUT" and "VIDEO OUT" of your TV or VCR.
2. Connect the other end to "AV IN/OUT" of camera/recorder.
3. Insert the cassette.

**NOTE:** Power source must be connected to the camera/recorder.

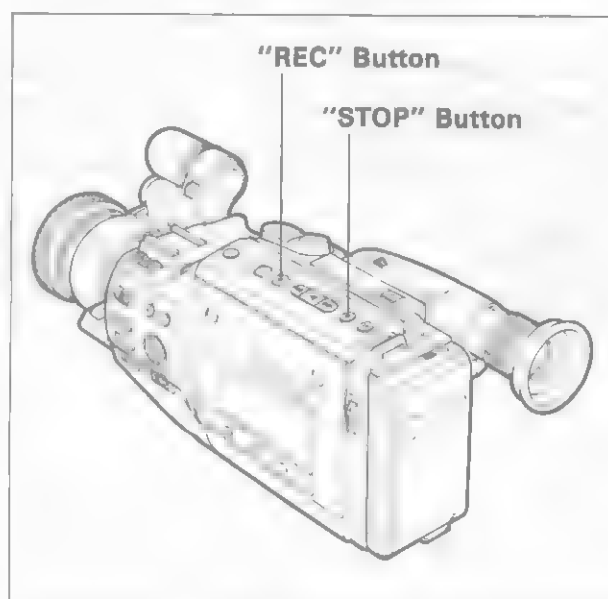
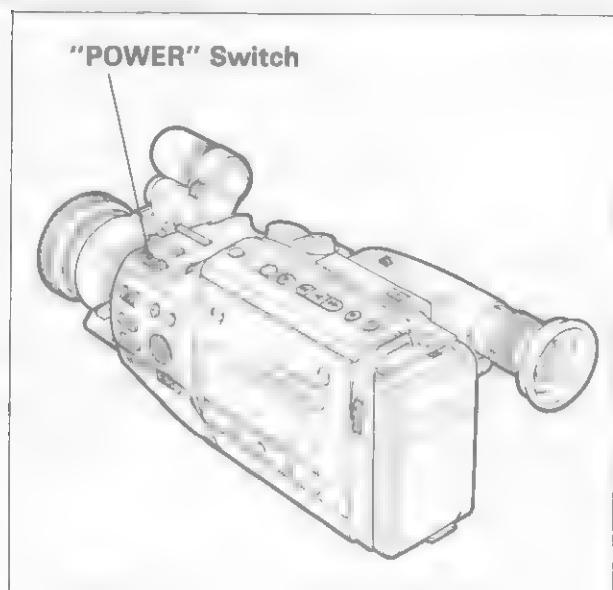
4. Slide the "POWER" switch of the camera/recorder to "VCR".

5. Turn on your TV or VCR and tune it to the channel you wish to record.

6. Press and hold down the "REC" button on the top of the camera/recorder for more than one second to start recording.

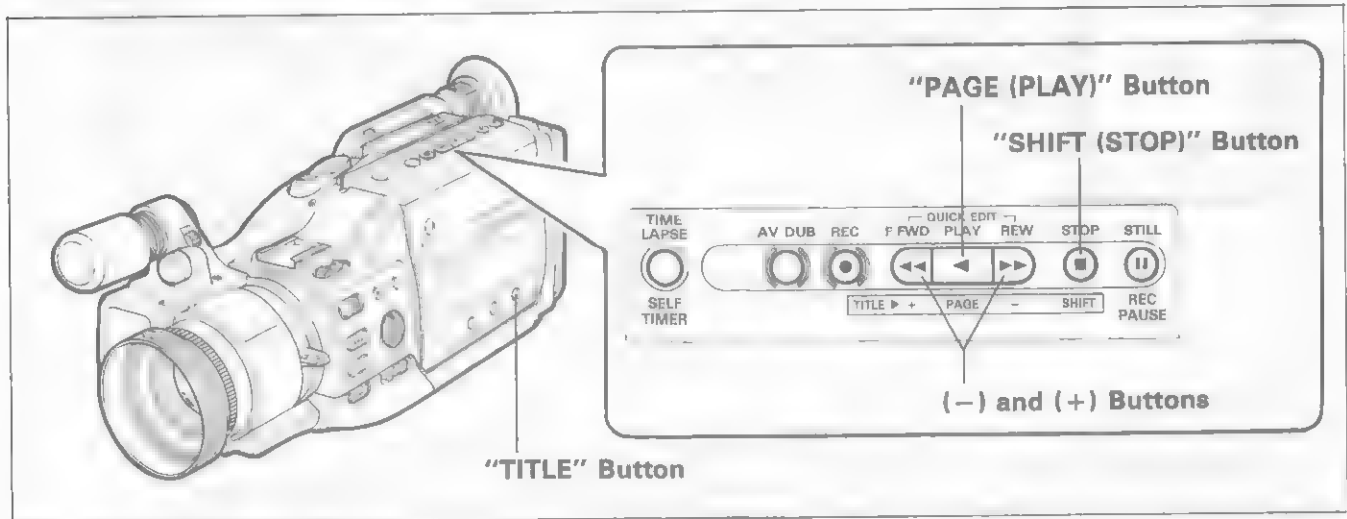
**NOTE:** The "REC START/STOP" button cannot be used since the "POWER" switch is set to "VCR".

7. Press "STOP" button to stop recording.



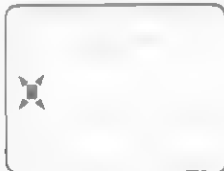
## TITLE RECORDING

You can easily create and record personalized titles on your videos with the camera/recorder's built-in titler. The titler will store 2 different title pages in memory. Once a title is stored, it can be displayed and recorded at any time. Each title page can contain one line of 16 characters each. The character contains 48 different characters for creating titles.



### ■ Creating a Title

1. Attach a power source to the camera/recorder.  
**NOTE:** "POWER" switch may be "VCR" or "CAM".
2. Press "TITLE" button. The flashing cursor will appear in the viewfinder.

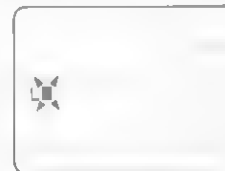


3. Press "SHIFT" button repeatedly to move the flashing cursor to the place you want to begin your title.
4. Select the first character for your title by pressing the (-) or (+) button repeatedly until the desired character appears.

**NOTE:** Each title can contain up to one line of 16 characters each. A chart showing the characters contained in the registers is located on page 33.



5. After you have selected the first character, press "SHIFT" button to move the flashing cursor to the place you want the next character.



6. Repeat steps 4 and 5 until you have completed the title.



**NOTE:** Character may flash, however it will be recorded correctly without flashing.

7. After completing your title, press "PAGE" button and create the title on another title page.
8. After creating the title, press "TITLE" button to remove the title graphics from the viewfinder. Now title graphics is stored in memory.



### ■ Correcting Errors During Programming

1. Press "SHIFT" button repeatedly until the character to be corrected will flash.
2. Press either "-" or "+" button until the correct character appears.

**NOTE:** The corrected character may flash, however it will be recorded correctly without flashing.

### ■ Recording Titles on a Tape in the Camera/Recorder

1. Slide "POWER" switch to "VCR".
  2. Locate the position on the tape that you wish to record the title.
  3. Slide "POWER" switch to "CAM".
  4. Press "TITLE" button to display the title graphics.
  5. Press "PAGE" button until the title you wish to record appears in the viewfinder.
  6. Press "REC START/STOP" button to start the title recording.
  7. Press "TITLE" button to remove the title graphics from the viewfinder.
- The camera/recorder will now record as normal.

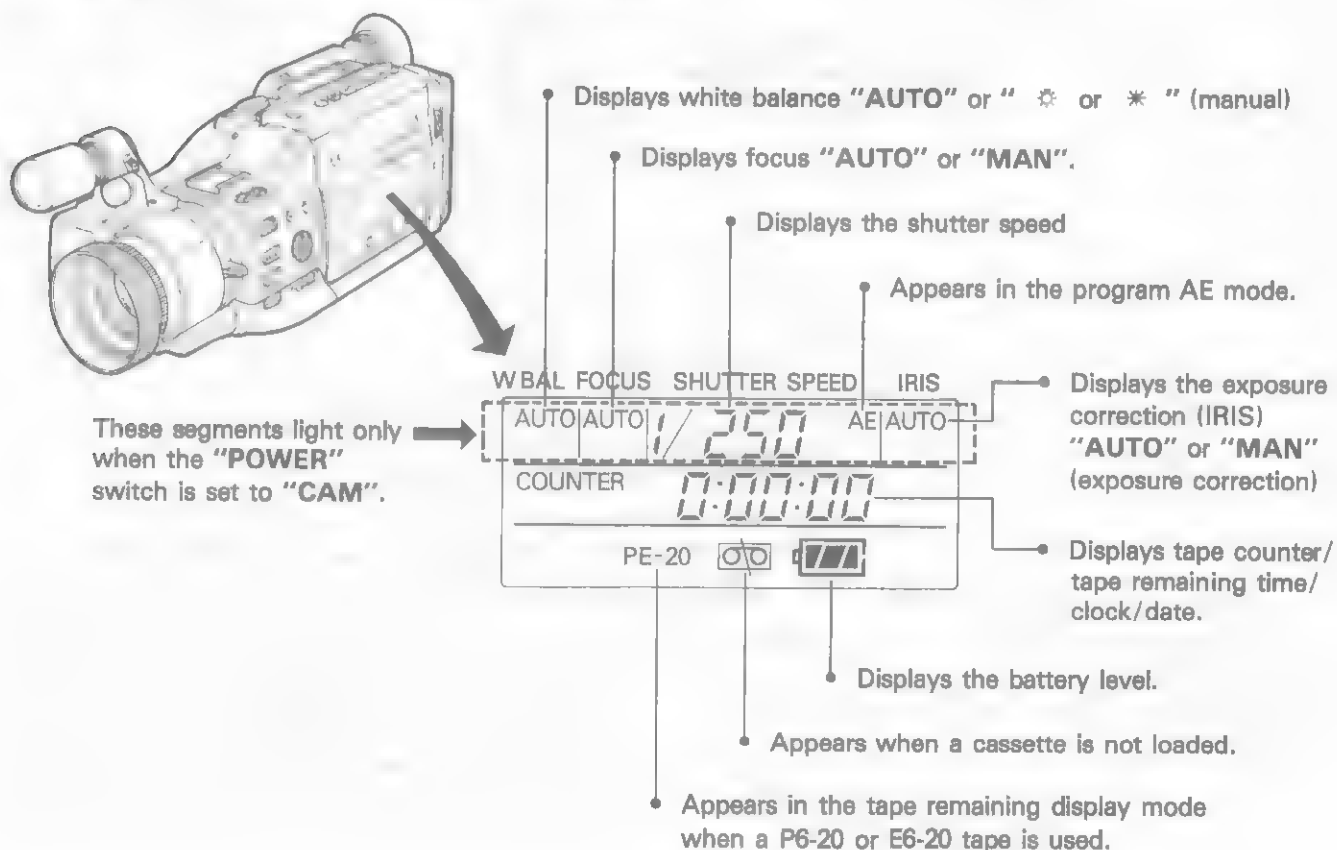
### ■ Recording Titles on Another VCR while playing a Tape Back with the Camera/Recorder.

1. Connect the camera/recorder and VCR.  
(See page 37.)
2. Select the title you wish to record (from page 1 or page 2). The last title selected will appear first. Press "TITLE" button to turn title off.
3. Set the VCR in the recording mode and camera/recorder in the playback mode.
4. Press "TITLE" button when you see the scene where you want to record the title.
5. Press "TITLE" button to erase the display from the viewfinder.

### ■ Chart of Characters available by using the CHARACTER control

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
S	T	U	V	W	X	Y	Z	0	1	2	3	4	5	6	7	8	9
?	'	.	/	,	-	:	;	<	>	→	←						

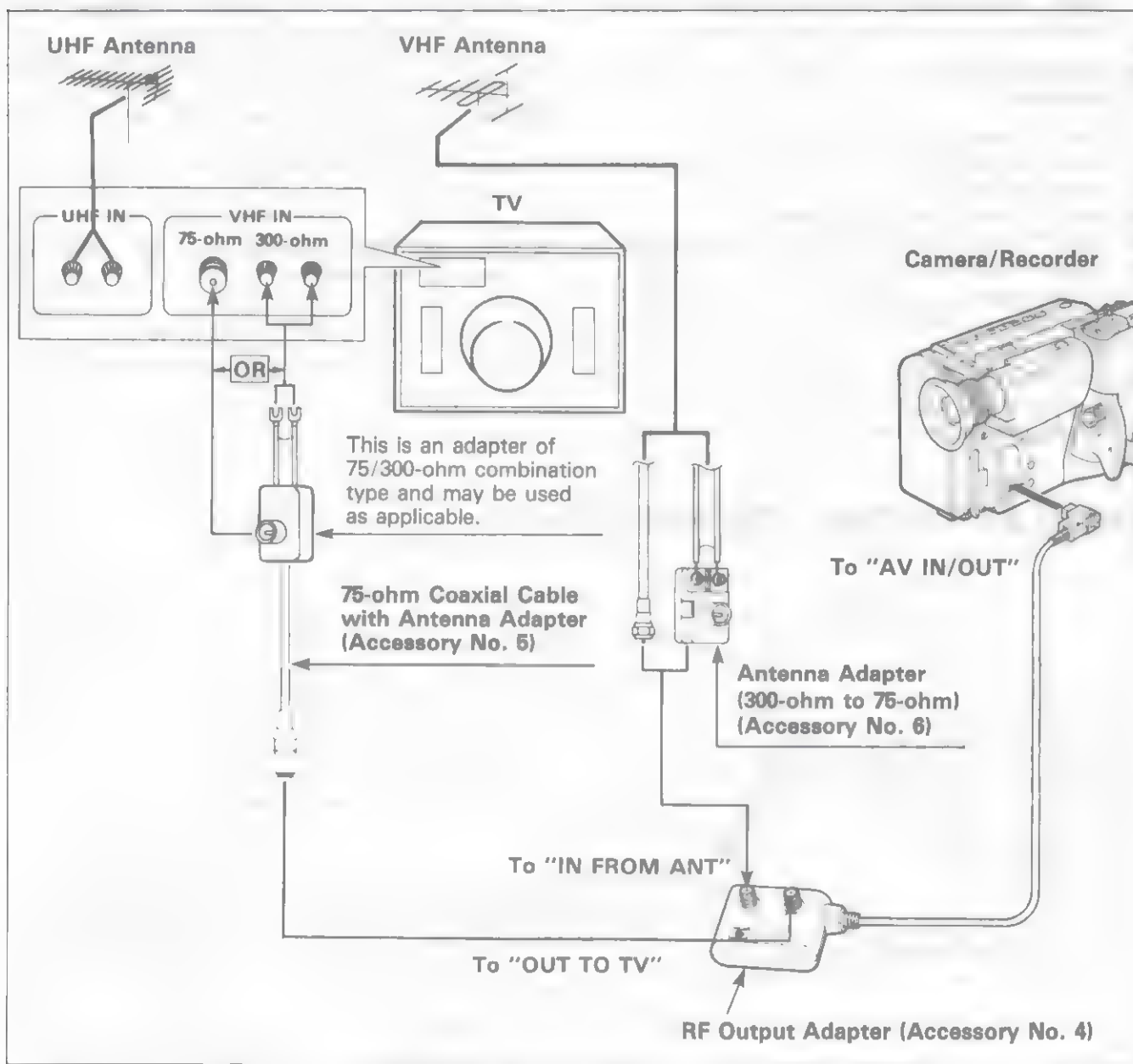
## DISPLAY IN THE LCD PANEL



## VIEWING THE PICTURE PLAYED BACK ON YOUR TV

To play back a tape recorded on your camera/recorder and view it on your TV receiver, you must connect the camera/recorder to the TV receiver using either AV output cord (Accessory No. 13) or RF output adapter (Accessory No. 4).

**Example 1: If your TV is a regular TV,**

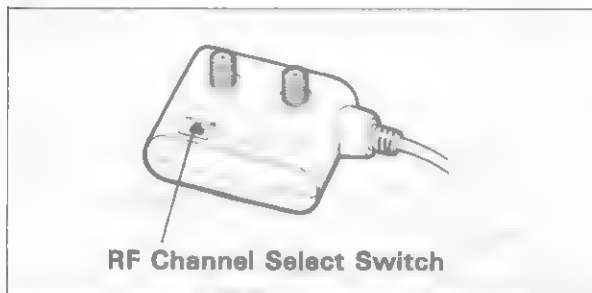


1. Disconnect the VHF antenna leads from the rear of the TV receiver.

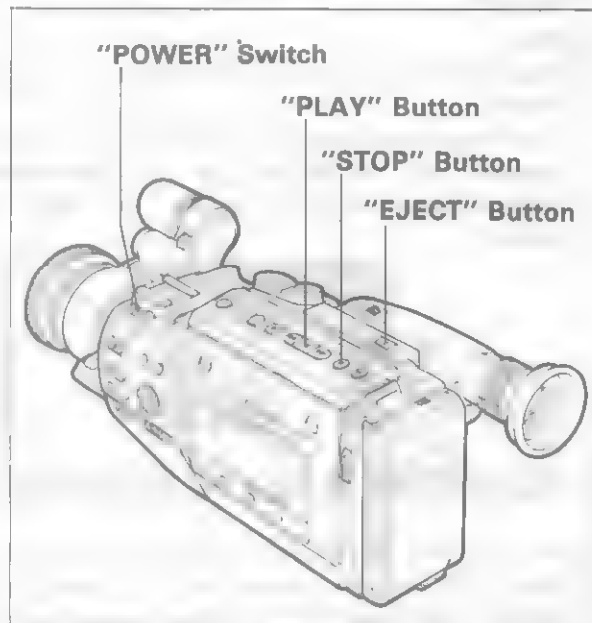
**NOTE:** Leave the UHF antenna leads connected to the TV.

2. Connect the VHF antenna lead to "IN FROM ANT" on the RF output adapter. If the cable is round (75-ohm), it will connect directly to the "IN FROM ANT". If it is the flat type (300-ohm), connect it to the antenna adapter (300-ohm to 75-ohm) and slip the adapter on to the "IN FROM ANT" terminal.

3. Connect the 75-ohm coaxial cable with antenna adapter to "OUT TO TV" on the RF output adapter.
4. Connect the other end to the VHF antenna terminal on the TV, as illustrated.
5. Connect the connector cable from RF output adapter to "AV IN/OUT" jack on the camera/recorder.
6. Turn on the TV and set to channel 3 unless channel 3 is one of the TV stations in your area. If channel 3 is used in your area, set your TV to channel 4.
7. Set the RF channel select switch on the RF output adapter to "CH3" or "CH4" to match the channel selector on your TV. This is the camera/recorder channel on your TV set. Your TV receiver must be tuned to this channel any time a video cassette is played back on the camera/recorder.



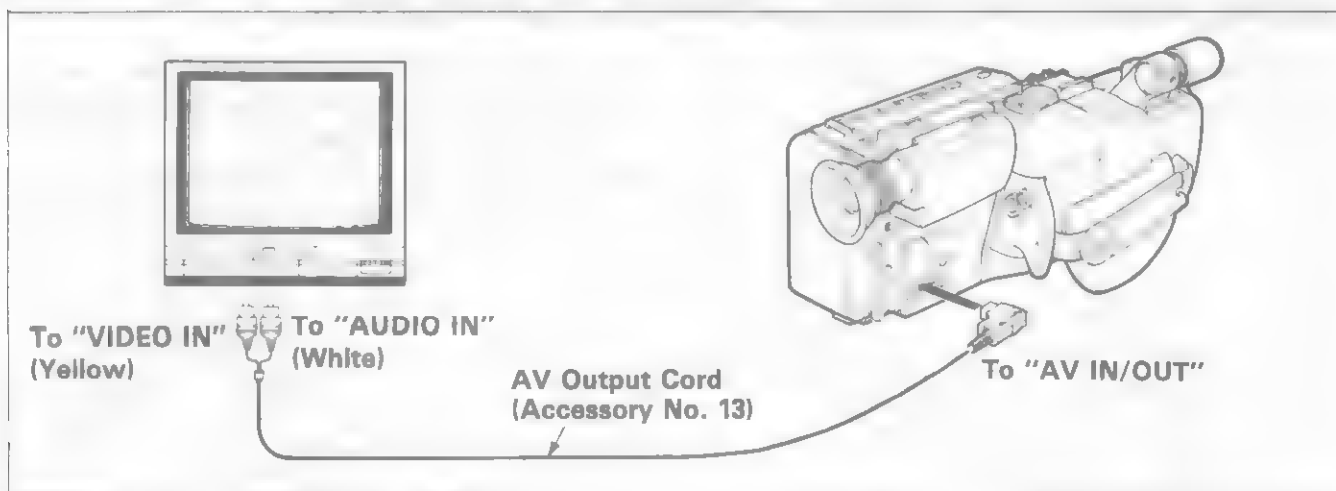
9. Slide "POWER" switch to "VCR".
10. Press "PLAY" button.
11. After playing press "STOP" button.



8. Press "EJECT" button on the camera/recorder and then insert the cassette.

**NOTE:** If you want to watch a TV program with camera/recorder connected as illustrated, slide "POWER" switch of the camera/recorder to off, or disconnect the connector cable of RF output adapter from "AV IN/OUT" jack on the camera/recorder.

**Example 2:** If your TV has "VIDEO IN" and "AUDIO IN" jacks,



1. Connect the AV output cord (Accessory No. 13) to "AUDIO IN" and "VIDEO IN" of your TV.
2. Connect the other end of the AV output cord to "AV IN/OUT" of your camera/recorder.
3. Turn on TV.

4. Perform same procedures in steps 8 through 11 of "Example 1" above.

**NOTE:** If a TV is already connected to the VCR, connect the AV output cord to the "VIDEO IN" and "AUDIO IN" jacks of the VCR.

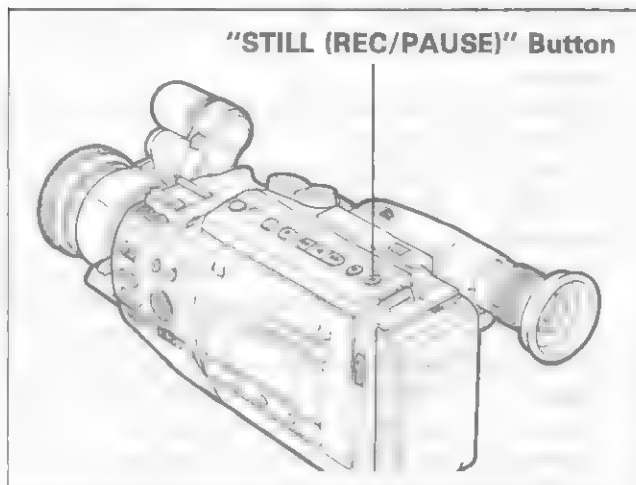


## STILL

When "STILL (REC/PAUSE)" button is pressed during playback, a still picture can be seen. To start again press "STILL (REC/PAUSE)" button and playback will be resumed.

### NOTES:

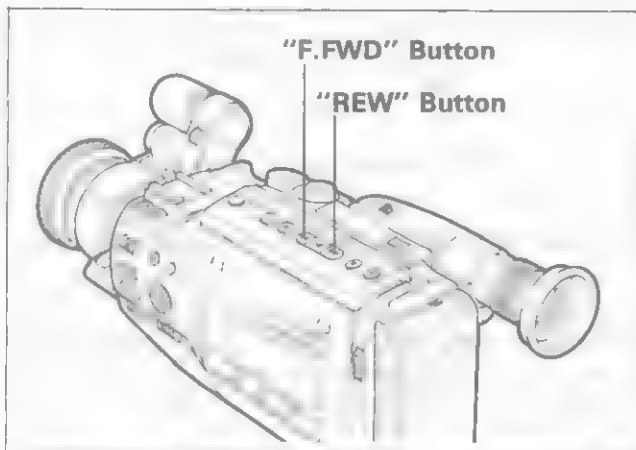
- There will be some noise (interference) in the still picture.
- If the play-pause mode continues for more than 5 minutes, the camera/recorder will automatically enter the stop mode to protect the tape from damage.



## F-SEARCH AND R-SEARCH

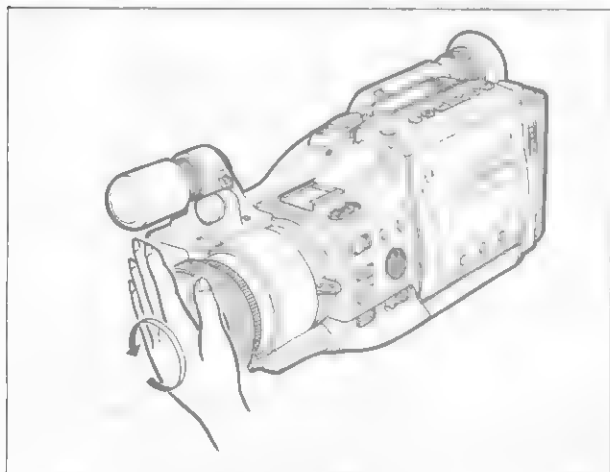
When you press "F.FWD" or "REW" button during playback, the tape will be played back at a speed about 9 times (forward search) or 7 times (reverse search) faster than the normal playback speed, and you can easily locate a certain spot on the tape.

**NOTE:** There will be some noise (interference) in the F-search or R-search pictures.



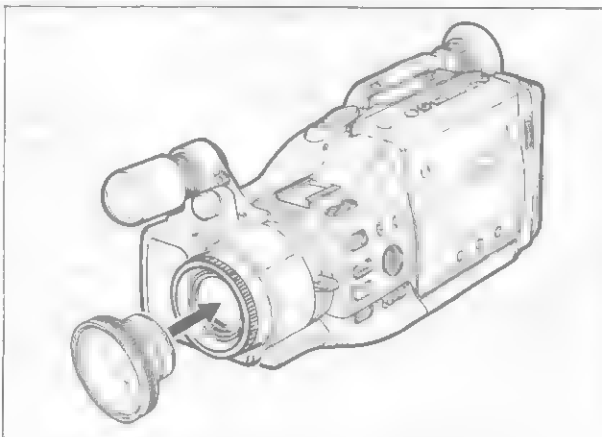
## ATTACHING THE TELE OR WIDE CONVERTER

1. To remove lens hood, put hand flat against lens hood and turn it counterclockwise.



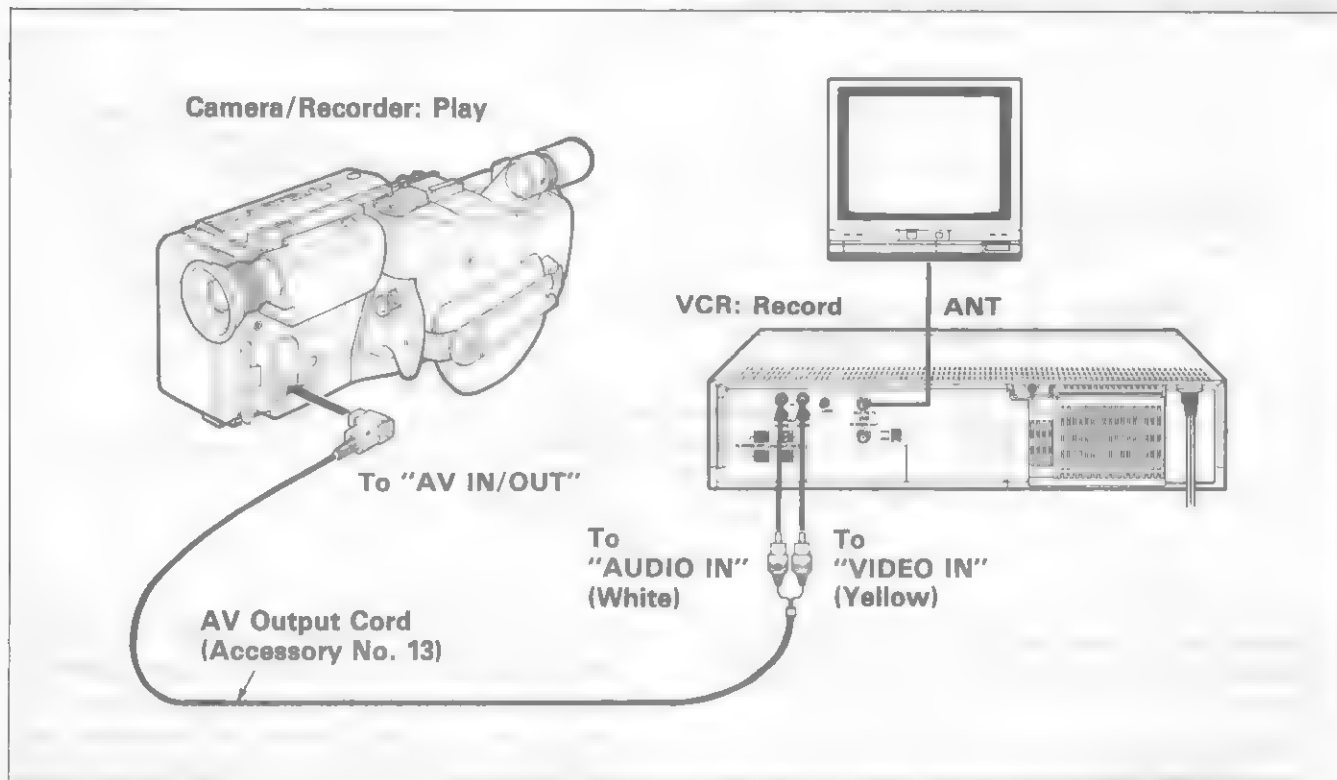
2. Remove both caps of the tele or wide converter.
3. Screw the lens into the threads on the front of video camera/recorder lens assembly.

**NOTE:** Auto focusing will not operate correctly when the tele or wide converter is attached to the video camera/recorder.



## CAMERA/RECORDER TO VCR DUBBING

If you wish to exchange or copy some of your friend's favorite home recordings, the following instructions can be used to connect camera/recorder to VCR for this purpose.



1. Connect the AV output cord to "AV IN/OUT" of your camera/recorder.
2. Connect the other ends to "AUDIO IN", "VIDEO IN" of your VCR respectively.
3. Play the tape on the camera/recorder and record it on the VCR.

**NOTE:** If you connect the "VHF OUT TO TV" connector of VCR to the "TV ANT" connector, as illustrated and set "VCR/TV" selector of the VCR to "VCR" mode, the picture being dubbed by VCR can be monitored.

## QUICK EDIT

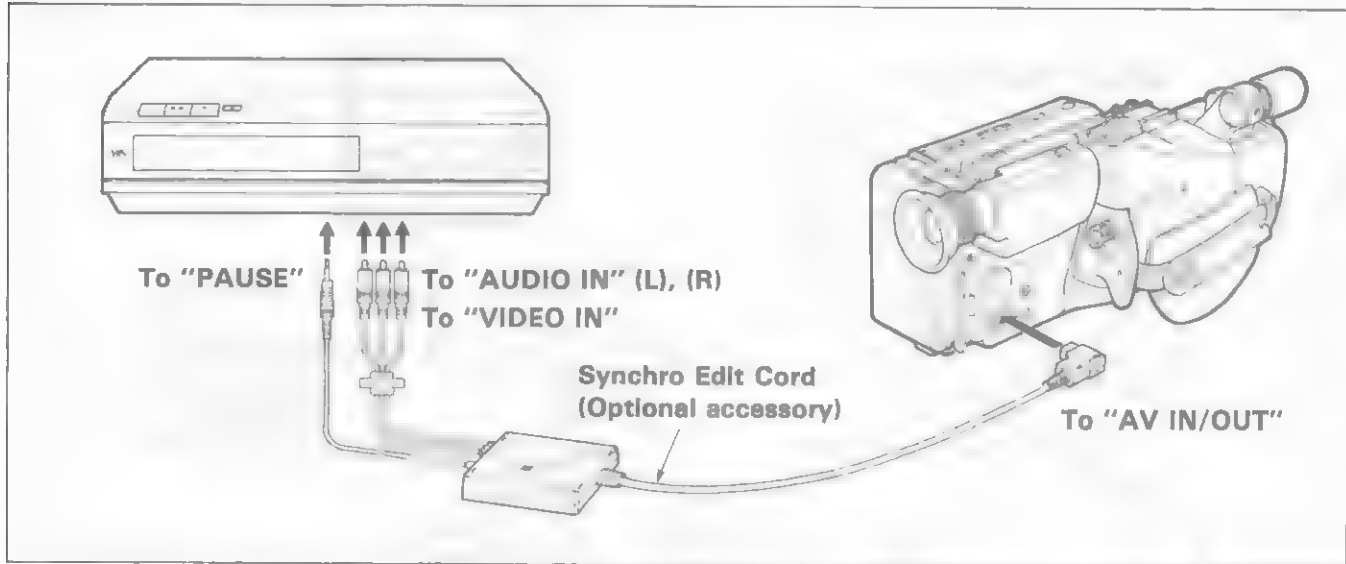
Visual scanning can be performed while "F.FWD" or "REW" button is held depressed in the record/pause (stand-by) mode. And also when "PLAY" button is pressed in the record/pause mode, playback can be done while it is held depressed. Use this feature to search for the end of the previously recorded material in the record/pause mode when you are going to record a new program on the remaining blank section of the tape.

## FLYING ERASE HEAD

A rotating erase head eliminates glitches and rainbow noise that occurs at the joints between recordings in previous models.

## SYNCHRO EDIT

Synchro edit allows your camera/recorder to control a compatible VCR (one that has a camera pause jack) while tapes are being copied from the camera/recorder to the VCR. This is convenient when you want to record only selected segments from a previously recorded tape.



1. Connect your camera/recorder to a compatible VCR as shown above. An optional synchro edit cord is required.

**NOTE:** If your VCR has a single (mono) audio input, connect either the left or right audio plug to the audio input on the VCR.

2. Insert the recorded tape into the camera/recorder.
3. Insert the blank tape into the recording VCR.
4. Press "PLAY" button on the camera/recorder and then press "PAUSE" button where you want to copy.
5. Press "RECORD" button on the VCR. The VCR automatically enters record/pause mode.

**NOTE:** If the VCR begins to record instead of pausing, you will need to change the position of the switch on the synchro edit cord. Stop the VCR, change the switch, and then press "RECORD" button on the VCR again.

6. Pressing "REVIEW" button on the camera/recorder puts the camera/recorder in the review mode for several seconds and then into the playback mode. The recording VCR starts recording automatically.

7. Pressing "REW", "F.FWD", "STOP" or "STILL (REC/PAUSE)" on the camera/recorder automatically put the VCR into the record/pause mode. This allows you to search (forward or backward), fast-forward or rewind the tape in the camera/recorder without disturbing the tape in the VCR.

- To search forward (or backward), press "F.FWD" (or "REW") button. When you press "PLAY" button, the camera/recorder will resume normal playback. To begin copying again, press "STILL (REC/PAUSE)" button and then the "REVIEW" button.
- To fast-forward (or rewind) the tape, press "STOP" then "F.FWD" (or "REW"). To begin copying again, press "STOP", then "PLAY", then "STILL (REC/PAUSE)" to pause the camera/recorder, and "REVIEW" to begin copying.



## TROUBLESHOOTING

Your camera/recorder is a highly sophisticated instrument. It has been carefully checked and adjusted at the factory under the most rigid quality control and inspection systems. However, should problems develop, check the following points and take necessary corrective measures.

### INSERTING OR REMOVING THE CASSETTE

Symptom	Check Point & Correction
Cassette holder cannot be opened when you press "EJECT" button.	* Connect the power source.
Cassette cannot be inserted into cassette compartment.	* Load cassette in direction indicated by arrow on cassette.
	* Cassette window must be toward outside.

### CAMERA RECORDING

Symptom	Check Point & Correction
Picture does not appear in the viewfinder.	* Remove the lens cap.
	* Slide "POWER" switch to "CAM".
	* Place the power save lever to "NORMAL".
	* Disconnect the AV input cord from the camera/recorder.
The camera/recorder will not go into the recording mode, even when "REC START/STOP" or "STILL (REC/PAUSE)" button is pressed.	* Check the record-protect tab on the cassette. See page 13 for details.
	* Set "POWER" switch to "CAM" position.
	* Place the power save lever to "NORMAL".
Picture is out of focus. Auto-focus does not operate.	* Set "FULL AUTO" switch to "ON" or "FOCUS" switch to "AUTO".
	* The camera/recorder is set to MACRO mode. Release the MACRO mode, and then focus on the object.
	* Auto-Focus does not operate if the wide or tele converter is attached.

### RECORDING TV PROGRAMS OFF THE AIR

Symptom	Check Point & Correction
The camera/recorder will not be set to the recording mode, even when "REC" button on the top of the camera/recorder is pressed.	* Check the record-protect tab on the cassette. See page 13 for details.
	* Set "POWER" switch to "VCR" position.
	* Connect the camera/recorder and TV (or VCR).

## PLAYBACK OF PRE-RECORDED CASSETTE

Symptom	Check Point & Correction
"PLAY" button cannot be engaged.	* Set "POWER" switch to "VCR" position.
No picture appears on television screen when "PLAY" button is pressed. (TV is connected to the camera/recorder by using RF output adapter.)	* Set the television to the camera/recorder channel (3 or 4) depending upon the selected channel on the RF channel select switch of RF output adapter.
Interference on playback picture.	* When you see the playback picture on your TV, adjust fine tuning knob on television set to obtain best picture.
Picture bends at the top of TV screen.	* TV receiver is of older type. It needs to be modified to work properly with camera/recorder. * Tape is damaged. Try another cassette.
Color of your TV screen is too bright, too faint or change.	* TV set has VIR circuit. Turn it off during playback.

## DEW

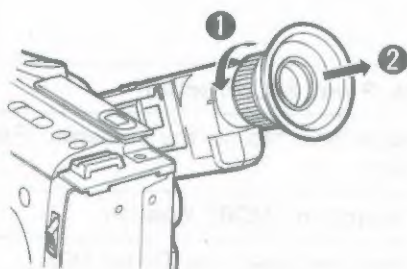
Symptom	Check Point & Correction
"DEW" indication flashes.	* Condensation on the camera/recorder mechanism — wait until the unit has reached normal room temperature, and condensation has dried. "DEW" indication will then stop flashing.

## BATTERY CONDITION

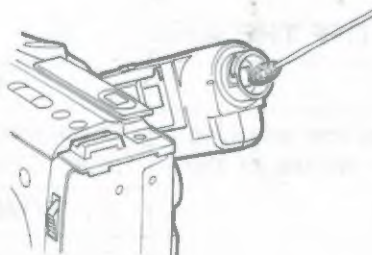
Symptom	Check Point & Correction
The "E" indication in the electronic viewfinder or " " in the LCD panel flashes to indicate battery is discharged.	* Try another battery or charge the battery.

### ■ CLEANING THE INSIDE OF THE ELECTRONIC VIEWFINDER

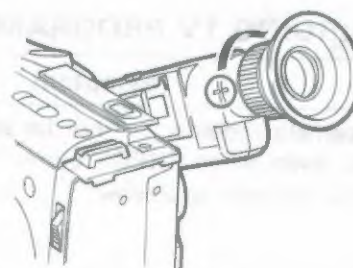
If dust or foreign matter adheres inside the viewfinder, clean it by the following procedure.



1. Rotate the eye cup and remove eye cup.



2. Clean picture tube face and lens.  
To prevent scratching, use a soft non abrasive cloth, swab or lens cleaning paper.



3. Align the reference mark and rotate the eye cup in the direction of arrow.



## HEAD CLEANING

- Picture playback may become blurred or be interrupted. This does not mean that the recorded program has been erased.
- Dirt accumulated on the head after long periods of use causes this problem. In this case, head cleaning requiring highly technical care is necessary.
- For head cleaning consult the nearest dealer or VCR service center for recommendations.

## PERIODIC MAINTENANCE

The video camera/recorder is a precision electromechanical device which will require periodic maintenance after a period of normal use. We expect that no maintenance other than head cleaning will be required during the warranty period by most users, unless the video camera/recorder is heavily used or seldom used. Normal maintenance is the responsibility of the user, although defective parts are covered during the warranty period. Consult your VCR service center to determine recommendations for normal maintenance based on your location, use patterns and machine age.

## SPECIFICATIONS

### ■ General

Power requirements	6V DC
Power consumption	6.4 watts (When "FULL AUTO" switch to "OFF" and "FOCUS" switch to "MAN".)
Dimensions	4"(W) x 4-5/16"(H) x 11-15/16"(D) 101(W) x 110(H) x 303(D) mm
Weight	2.3 lbs (1.0 kg)
Operating temperature	32°F ~ 104°F
Storage temperature	-4°F ~ 140°F

### ■ Video Recorder Section



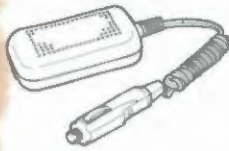








Format	8mm
Record/playback system	Two video record/playback heads
Video signal	EIA standard NTSC color
Tape speed	14.3 mm/sec.
Video input	1.0 Vp-p, 75 ohm
Video output	1.0 Vp-p, 75 ohm
Audio input	-7.8 dBs (316 m Vrms)
Audio output	-7.8 dBs (316 m Vrms)
Fast forward/rewind time	Less than 8 minutes with P6-120 cassette

### ■ Camera Section

Scanning	525 lines/60 fields/30 frames
Required minimum illumination	2 lux
Pickup device	1/2" C.C.D
Lens diameter	46 mm



## OPTIONAL ACCESSORIES

<b>Battery Pack</b> (for standard play) <b>VM-BP82</b>	<b>Battery Pack</b> (for long play) <b>VM-BP83</b>	<b>Car Battery Cord</b> <b>VM-CC80A</b>	<b>Alkaline Battery Case</b> <b>VM-BP85C</b>
			
<b>Synchro Edit Cord</b> <b>VM-CH95OUT</b>	<b>Carrying Case</b> <b>VM-CB93</b>	<b>Remote Controller</b> <b>VM-RM85</b>	<b>Rains &amp; Snow Pack</b> <b>VM-RP87</b>
			
<b>Tele Conversion Lens</b> <b>VM-CL30T</b>	<b>Wide Conversion Lens</b> <b>VM-CL30W</b>	<b>Car Adapter/Charger</b> <b>VM-CA80A</b>	
			

**For U.S.A. only**

**For more information on the Hitachi Camera/Recorder and accessories see your local Hitachi dealer. Or call toll free to locate the Hitachi parts distributor nearest you in the continental U.S.A. Dial toll free 1-800-448-2244. You must state zip code when calling.**